A.M.A. Journal OF
DISEASES OF CHILDREN

Methemoglobin Values in Premature and Mature Infants and Children
Harvey Kravitz, Lawrence D. Elegant, Elizabeth Kaiser, and Benjamin M. Kagan

Non-Endocrine Dwarfism and Pseudoepiphyses
Richard Wagner

A Dysraphism of the Laryngeal Nerve
Charles C. Chapple

A Rapid Micromethod for the Determination of Indirect Bilirubin
Joanne E. Mertz and Clark D. West

Breath-Holding Spells
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Sickle-Cell-Hemoglobin-C Disease
Lt. Norman B. Schell and Lt. Comdr. Joseph M. McGinley

Necrotizing Arteritis Confined to the Pulmonary Artery System
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Lichen Sclerosus et Atrophicus in Childhood
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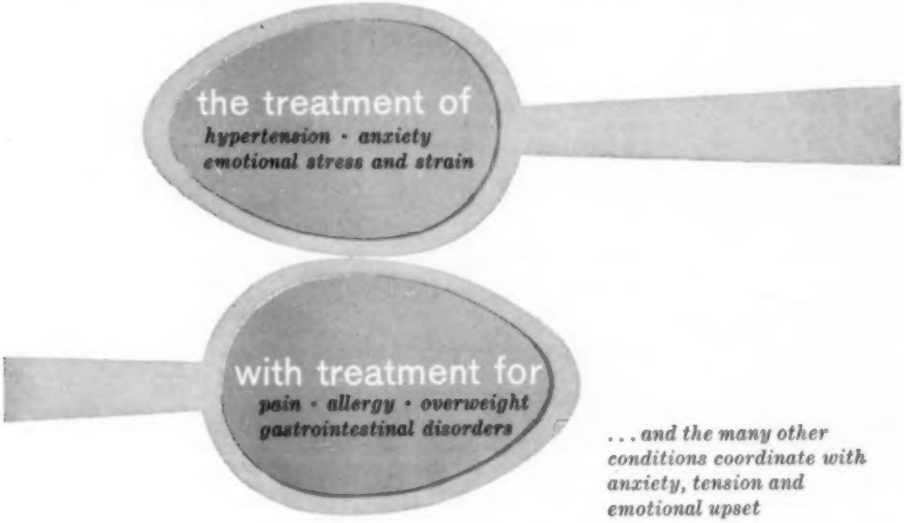

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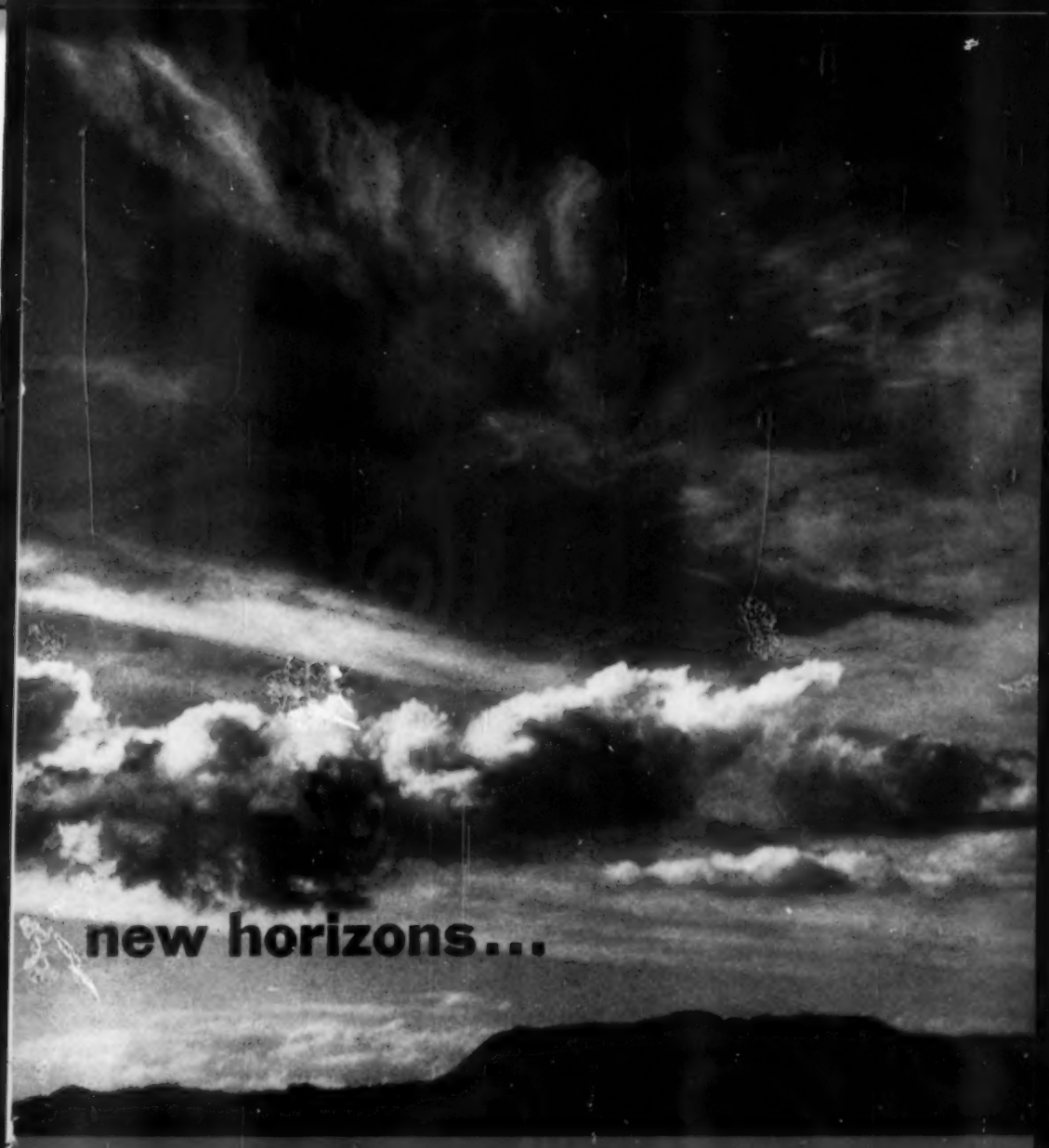

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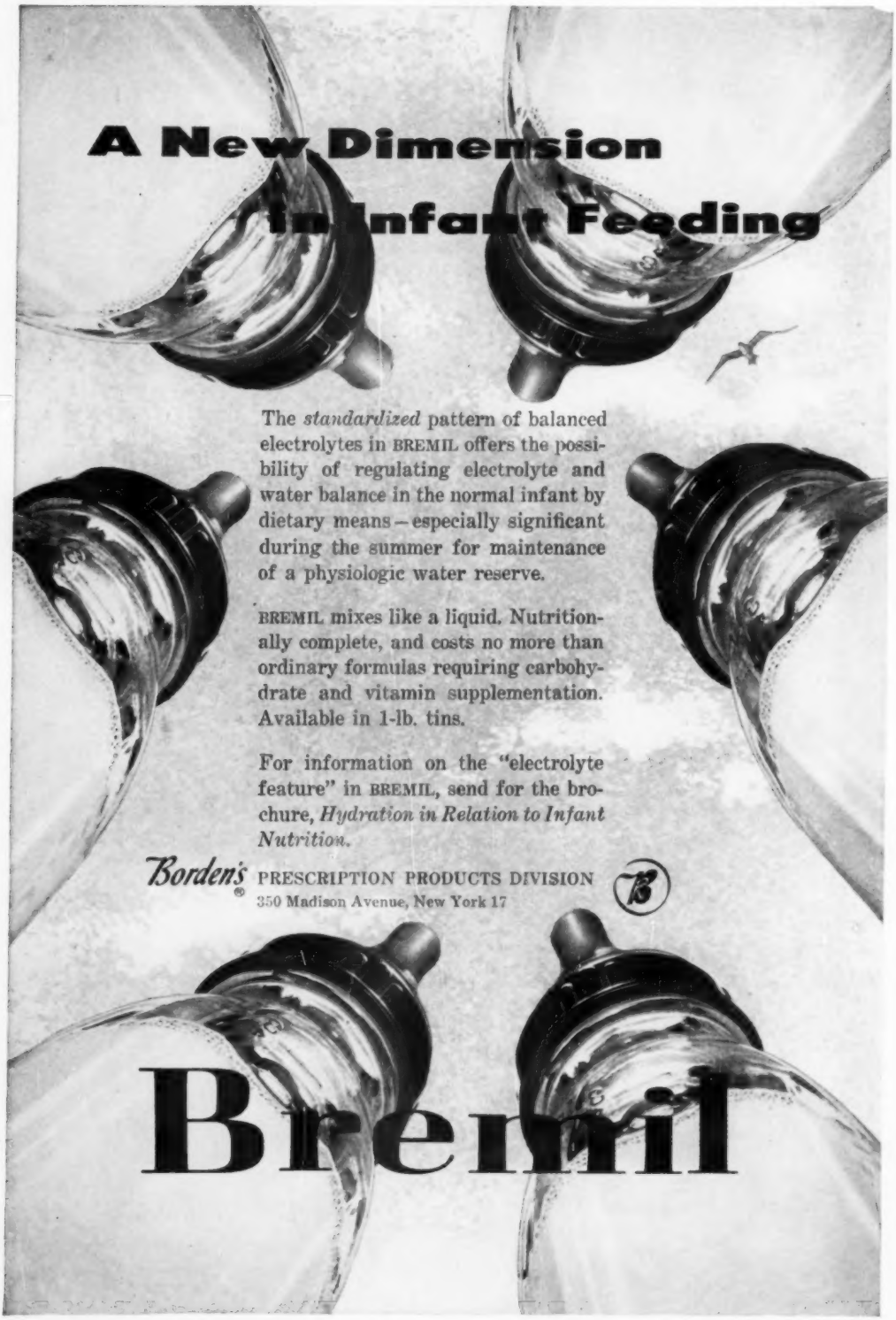
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1. Bowes, A. deP.: Dietotherapy—Nutrition of Children During Their School Years. Am. J. Clin. Nutrition 3: 254 (May-June) 1955.
2. Kelly, H. T.: Impact of Modern Nutrition on Twentieth Century Morbidity, Pennsylvania M. J. 58: 481 (May) 1955.
3. Cantarow, A., and Trumper, M.: Clinical Biochemistry, ed. 5, Philadelphia, W. B. Saunders Company, 1955, pp. 139, 140.

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2. Gatski, R.L.: Chlorpromazine in the Treatment of Emotionally Maladjusted Children—A Preliminary Report, J.A.M.A. *157*:1298 (April 9) 1955.
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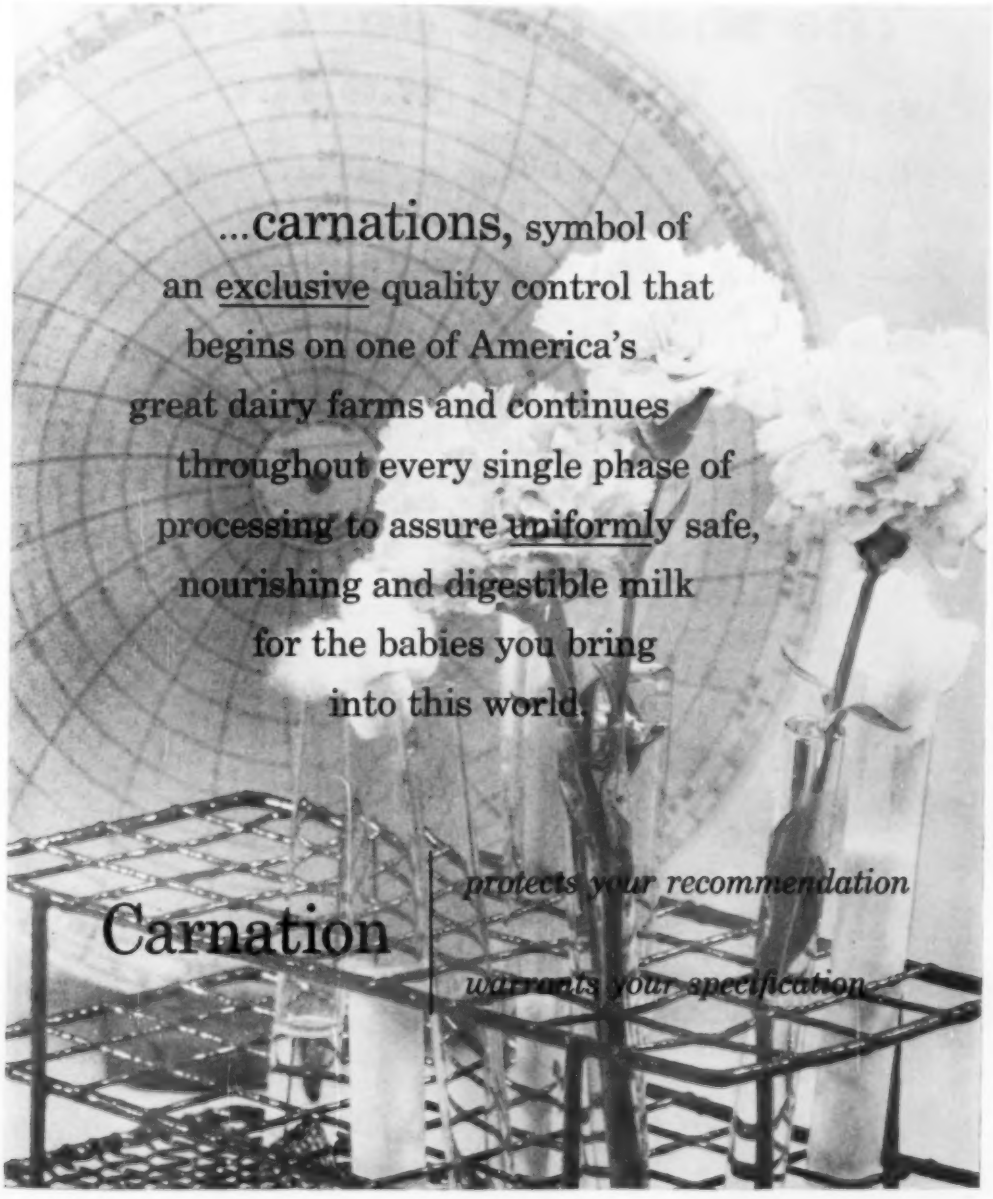

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Methemoglobin Values in Premature and Mature Infants and Children

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The concentration of methemoglobin in the blood serum of normal premature infants, full-term newborn infants, and older infants and children was the subject of this study.

Methemoglobin may exist in small amounts normally in the blood of children and adults.* It has also been found as a normal constituent of the blood in various animals.† The only normal children reported, however, were in the study by Paul and Kemp,[1] and the youngest was 7 years.

There have been numerous reports of methemoglobinemia following poisoning [7] or following administration of sulfonamide, acetanilid, and many other drugs.[8] Methemoglobinemia in infants due to ingestion of water containing high concentrations of nitrates is well known.[9]

The principle aim of the present study was to determine the amounts of methemoglobin in the blood of normal premature and mature newborn infants and of older children.

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* References 1-3.

† References 4-6.

TABLE 1.—*Comparison of Methemoglobin and Hemoglobin in Capillary (Heel) and Venous (Femoral) Blood*

Subject	Age	Hemoglobin		Methemoglobin		Methemoglobin as per Cent of Total Hemoglobin	
		Venous, Gm./ 100 Cc.	Capillary, Gm./ 100 Cc.	Venous, Gm./ 100 Cc.	Capillary, Gm./ 100 Cc.±	Venous	Capillary
B. S.	Full term, 24 hr.	18.6	18.6	0.26	0.22	1.3	1.1
S. S.	Full term, 24 hr.	14.2	14.2	0.24	0.16	1.6	1.1
F. M.	Full term, 12 hr.	16.2	16.2	0.19	0.16	1.1	0.9
H. H.	Premature, 6 days	....	....	0.26	0.22	...	...
B. W.	Premature, 31 days	19.4	19.4	0.36	0.24	1.8	1.2
H. P.	Premature, 72 days	8.9	10.0	0.13	0.24	1.4	2.3
A. L.	Premature, 19 days	16.0	15.0	0.28	0.36	1.7	2.3
Mean		15.5	15.5	0.24	0.22	1.6	1.6
Standard deviation		±3.7	±3.3	±0.06	±0.06	±0.25	±0.64

MATERIAL AND METHODS

The premature infants and mature infants included in this study were from the premature station and newborn nursery of Michael Reese Hospital. All were free of known disease. None had respiratory distress or cyanosis.

All children‡ were convalescing from minor surgical procedures. None had respiratory difficulty or cyanosis. Subjects receiving medication were excluded.

Capillary blood in amounts of 0.5 to 1.0 ml. was obtained from the heel and collected in tubes containing a mixture of 10 mg. ammonium and potassium oxalate. Venous blood was obtained from some subjects either from the jugular or the femoral vein. Blood was obtained from the antecubital veins of the older children and adults. All analyses were completed within 45 minutes after the bloods were drawn.

The water used in preparing the milk mixtures fed to the infants was from the Chicago water system. The source is Lake Michigan. Analyses of this water by the Water Purification Division of the City of Chicago showed that nitrate was present in very small traces (0.027 ppm). No nitrite was present. Analyses of the milks being fed showed no detectable nitrate.§

The premature infants routinely received 75 mg. of vitamin C orally each day from the seventh day of life. During the study no aniline dyes were used in stamping the diapers.[7]

Methemoglobin was determined by a minor modification of the procedure described by Michel and Harris.[10] The method permits determination of minute amounts of methemoglobin with great sensitivity.

RESULTS

Table 1 shows that there is no significant difference in methemoglobin or hemoglobin concentration between capillary and venous blood in premature and full-term infants.

‡ The adults were selected as apparently normal individuals in the outpatient department who were being subjected to venipuncture for routine serologic tests and also some from patients in Michael Reese Hospital who were convalescing from minor surgical procedures.

Eight additional premature infants from the Children's Hospital of Cook County Hospital were included through the courtesy of Dr. Abraham Levinson and Dr. Irving Abrams.

§ These determinations were done in the laboratories of the Chicago Board of Health, City of Chicago, through the courtesy of Dr. Herman Bundesen and Dr. Robert T. McFate.

TABLE 2.—*Summary of Methemoglobin in the Blood of All Groups Tested Compared to Those of Kemp's and Van Slyke*

	Methemoglobin, Gm./100 Cc.					Methemoglobin as per Cent of Total Hemoglobin			
	No. Cases	No. Det.	Mean	Range	Standard Dev.	No. Cases	No. Det.	Mean	Range	Standard Dev.
Premature (birth-7 days)	29	34	0.43	(0.02-0.83)	±0.07	24	28	2.3	(0.08-4.4)	±1.26
Premature (7-72 days)	21	29	0.31	(0.02-0.78)	±0.19	18	23	2.2	(0.02-4.7)	±1.07
Premature (total)	50	63	0.38	(0.02-0.83)	±0.10	42	51	2.2	(0.08-4.7)	±1.10
Cook County Hospital, premature (1-14 days)	8	8	0.52	(0.18-0.83)	±0.08	..	..	...	.....	.....
Newborns (1-30 days)	39	39	0.22	(0.00-0.58)	±0.17	25	30	1.5	(0.00-2.8)	±0.81
Infants (1 mo.-1 yr.)	8	8	0.14	(0.02-0.29)	±0.09	8	8	1.2	(0.17-2.4)	±0.78
Children (1-14 yr.)	35	35	0.11	(0.00-0.33)	±0.09	35	35	0.79	(0.00-2.4)	±0.62
Adults (14-78 yr.)	39	39	0.11	(0.00-0.28)	±0.09	27	27	0.82	(0.00-1.9)	±0.63
Kemp (7-78 yr.)	100	100	0.09	(0.01-0.5)	.....	100	100	0.40	(0.01-0.80)	.....
Van Slyke (adults)	19	19	0.10	(0.00-0.21)	.....	19	19	0.40	(0.00-1.1)	.....

The methemoglobin concentrations for the various groups are shown in Table 2. The increased concentrations of methemoglobin in the premature infants is obvious. The methemoglobin levels are highest in the premature infants in the first 48 hours of postnatal life. Lower values are present in mature newborn and older infants. Infants of one month to one year have lower concentrations of methemoglobin than premature or full-term infants, but they have more than older children.

Older children and adults have similar methemoglobin levels (Table 2). The mean values of 0.11 gm/100 cc. for children and 0.11 gm/100 cc. for adults agree closely with the 0.09 gm/100 cc. found by Paul and Kemp [1] and by Van Slyke and co-workers [2] in a group of patients varying from 7 to 78 years. Methemoglobin expressed as per cent of total hemoglobin was somewhat higher than that reported by Paul and Kemp [1] and by Van Slyke and co-workers [2] but still much lower than those of premature and newborn infants.

Table 3 shows the results of analyses of cord blood taken immediately after clamping of the umbilical cords of full-term normal newborn infants. The methemoglobin levels tend to be lower than those taken after the first day of life. They are in fact approximately the same as those of adults. Apparently the methemoglobin level increases shortly after postnatal existence.

The data showed a relationship between age and methemoglobin levels in the premature infant; as the infant gets older, the levels become lower. There was also a correlation between the concentrations of methemoglobin and the weights of the different infants in any one of the groups and also with the weight at the time the determination was done. The lower weight groups had higher methemoglobin levels, and hemoglobin levels were observed.

Serial determinations in each of 11 premature infants showed a decrease in concentration as the infants grew older and heavier. Within three weeks of birth, most reached the concentration present in older infants and children. By 4 weeks of age all but two of the determinations showed concentrations similar to those of older infants and children.

TABLE 3.—*Methemoglobin in Cord Blood of Mature Newborn Infants*

Name	Weight	Hemoglobin, Gm./100 Cc.	Methemoglobin, Gm./100 Cc.	Methemoglobin as per Cent of Total Hemoglobin
T. D.	Mature	13.0	0.02	0.15
M. B.	Mature	15.0	0.10	0.66
J. S.	Mature	16.0	0.16	0.99
R. C.	Mature	16.9	0.13	0.76
B. P.	Mature	20.5	0.19	0.98
B. T.	Mature	14.6	0.02	0.02
P. M.	Mature	16.0	0.16	0.16
M. G.	Mature	16.0	0.03	0.03
Mean		16.0	0.10	0.47
Standard deviation		±1.8	±0.07	±0.4

COMMENT

In no instance was the methemoglobin concentration high enough to cause visible cyanosis. Finch and co-workers || state that 1.5 gm. of methemoglobin per 100 ml. is required to produce recognizable cyanosis. Nevertheless, it is of interest to consider the cause of this small but significant increase in methemoglobin concentration.

Cornblath and Hartmann [9] offer an interesting explanation for the susceptibility of young infants to methemoglobinemia. They state that because of the low pH of the gastric juices, nitrite-producing bacteria can exist high in the gastrointestinal tract in significant numbers and reduce nitrate to nitrite

|| References 11 and 12.

before the former can be absorbed. However, they were able to produce increases in blood methemoglobin in young infants only by feeding high doses of nitrate (50 mg. of nitrate ion). At one point in this study consideration was given to the possibility that the methemoglobin levels being observed in the premature infants were a local phenomenon due perhaps to the water source. However, it is thus highly improbable that the small amount of nitrate in the lake water can explain the increased methemoglobin concentration in premature and newborn infants.

Barcroft and co-workers [13] and others ¶ state that there is a slow oxidation of hemoglobin to methemoglobin but that the reducing systems in erythrocytes are sufficiently active to keep the concentration of methemoglobin very small. In cases of congenital methemoglobinemia they suggested that there is a deficiency of coenzyme Factor I in the erythrocytes compared to that of normal cells. If this theory is correct there may be a temporary decrease in the amount of coenzyme Factor I in the erythrocytes of premature and newborn infants, allowing for a greater degree of methemoglobinemia. However, Waisman and co-workers [17] attempted to corroborate Barcroft's hypothesis but were unable to show that reduced Coenzyme I reacts directly with methemoglobin in normal cells. They were unable to show any cytochrome-reductase activity in either methemoglobinemic cells or normal cells.

It is possible that fetal hemoglobin may play a part. Betke [18] found that fetal hemoglobin can be more readily oxidized to methemoglobin by potassium ferricyanide than adult hemoglobin. It is significant that as the fetal hemoglobin is replaced by mature hemoglobin the methemoglobin levels decrease. By approximately three months the values for methemoglobin drop to values found in children and in adults. Another possibility is that vitamin C added to the diet on the seventh day of life as in the nursery causes a gradual decrease in methemoglobin concentration.

Finally formation of methemoglobin has been reported in the presence of intravascular hemolysis.# Therefore the relatively increased destruction of red blood cells that occurs normally in newborn and premature infants may account for the increased methemoglobin concentrations.

¶ References 14-16.

SUMMARY

Values for methemoglobin were found to be significantly elevated in premature infants as compared to newborn mature infants and to older children and adults. Immediately after birth the values are also similar to those of older children and adults. All values were statistically significant.

Values for premature infants over 4 weeks of age and for older infants are similar to those of older children and adults.

The methemoglobin levels of the premature infants were found to be the highest from the second to the seventh days of life, inclusive. However, the increase was small and not sufficient to cause cyanosis.

The various possible mechanisms for these changes are discussed.

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Non-Endocrine Dwarfism and Pseudoepiphyses

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Non-endocrine deviations from the normal pattern of osseous development were described in a previous study.[1] Dwarfism and retarded skeletal maturation were reported in six boys, two of whom had heart murmurs and one bilateral "pseudoepiphyses."

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The purpose of this communication is to report the observations in nine cases of an analogous linkage of dwarfism, retarded osseous maturation, a congenital heart murmur, and sexual infantilism in the three children who have reached the age of pubescence.

REPORT OF CASES

The important features of the cases are presented in the Table. The history of one case is reported in detail as a representative example of the entire group.

CASE 4.—A white boy who was first admitted to the hospital on March 24, 1951, at the age of 10 years, because of an undescended testicle and the

Important Features of the Cases *

Case No.	Sex	Age, Yr.	Height/ Average Height for Age, Cm.	Weight/ Weight for Height, Kg.	Bone Age According to Todd's Standards, Yr.	"Pseudo-epiphyses"	Systolic Murmur	Remarks
1	M	6 10/12 13 2/12	104/125 134/158	18.2/17.5 34.5/31.8	4 12 3/12	+	+	17-Ketosteroids at 13 2/12 yr. 7.1 mg. in 24 hr.; beginning growth of pubic hair
2	M	9 11/12 11 15 6/12	112/147 116/152 133/166	21.2/18.9 22.8/20.3 32.8/26.2	5 9/12	+	+	I. Q. 72; basal level 6 yr.; sexual infantilism; 17-ketosteroids at 15 6/12 yr. 5.42 mg. in 24 hr.
3	M	4	94/111	13.5/14.2	1	+	+	Mother of child exhibits fusion of some of the cervical vertebrae
4	M	10 1/12 10 11/12 12 2/12 13 2/12	122/147 127/152 129/156 133/164	31.4/22.1 31.4/23.9 36/24.8	6 3/12	+	+	Marked sexual infantilism at the age of 13 yr.; 17-ketosteroids 2.4 mg. in 24 hr.; no 12-yr. molars
5	M	6	101/122	14.6/15.1	2 9/12	+	+	Slow growth rate during the last 2 yr. with rapid increase in weight (7.65 kg.)
6	M	5	96/117	13.5/14.6	3 3/12	+	+	.....
7	M	1 6/12	78/85	11.6/9.6	9/12	+	+	Bilateral inguinal hernia; hypochromic anemia; mental retardation; fracture-like "pseudoepiphyses"
8	M	6 6/12	96/126	15.3/14.2	2 9/12	0	+	X-ray indicates a left-to-right shunt; a ventricular septal defect is the most likely possibility
9	F	1 6/12	73/84.5	9.5/8.3	6/12	+	+	Diagnosis of ventricular septal defect was made by the cardiologist of another hospital; umbilical hernia
10	M	5 2/12 7 8	109/120 119/130 120/136	16.7/16.2 19.8/20.5 21.4/20.5	4 3/12	0	+	.....
11	M	3 2/12	94/105	11.7/13.3	1	+	+	The "pseudoepiphyses" reveal the same shape as those in Case 7

* Cases 1, 2, and 3 identical with Cases 1, 2, and 6 in previous study.[1]

question of adiposogenital dystrophy. He was an only child. Birth had occurred at term by breech delivery, weight 5 lb. The first year of life had been uneventful. He sat at 6 months, stood at 8 months, walked and talked at 12 months, and the first teeth had erupted at 13 months. He was in the fifth grade at school.

On physical examination he was slightly obese; weight 31.4 kg. (+4.95 kg.), height 122 cm., $\frac{\text{upper measure}}{\text{lower measure}}$ 1.14. He was myopic, but the fundi and visual fields were normal. The heart was normal in size. There was a loud, harsh systolic murmur at the left border of the sternum, no thrill, and no cyanosis. The ECG was within normal limits. The right testicle was not palpable, and the left testicle was in the scrotal sac, normal in size for a boy before the advent of puberty, and normal in consistency. The penis appeared to be normal in length. The I. Q. was within normal limits, with superior level tendencies. The B. M. R. was —8. The glucose tolerance and glucose-insulin tests were normal. The x-ray of the skull was negative, and the bone age was $6\frac{3}{12}$ years.

The boy was readmitted to the hospital three times. His height in August, 1951, at the age of $10\frac{1}{2}$ years, was 126 cm. X-ray of the wrist still showed considerable retardation in bone development.

In February, 1952, at the age of $10\frac{11}{12}$ years, the height was 127 cm., the weight 31.5 kg.

In April, 1952, at the age of $11\frac{2}{12}$ years, the height was still 127 cm., which is 26 cm. below the average. The 17-ketosteroid excretion in 24 hours was 2.9 mg., which is normal for a boy before the advent of puberty and higher than would be found in a pituitary dwarf with lack of gonadotropic activity. The blood cholesterol was 235 mg. per 100 cc. and the uptake of radioactive iodine 17.3%. The glucose tolerance and glucose-insulin tests were within normal limits. There were no signs of sexual development and no development of extragenital sexual characteristics. The right testicle was still undescended, the left completely immature.

In November, 1952, the height was 128.5 cm. A course of injections of chorionic gonadotropin was given by the family physician during the next few months. The boy received 500 I. U. of A. P. L. three times a week, up to a total amount of 6000 units.

The patient was readmitted for observation in April, 1953, at the age of $12\frac{2}{12}$ years. His height was 129 cm., the upper measure from crown to symphysis 67.5 cm., the head circumference 53.5 cm., the chest circumference 70 cm., and the weight 36.1 kg. The right testicle was found to be in the scrotal sac; it was smaller than the left and softer in consistency. There were no essential changes in his general appearance and no signs of sex development. The harsh systolic murmur along the left border of the sternum was unchanged. The ECG was suggestive of an incomplete right bundle-branch block.

At the age of 13 years 2 months his height was 133 cm., and there was still no evidence of sex development. The 17-ketosteroid excretion amounted to 2.4 mg. in 24 hours. F. S. H. excretion in the urine was negative. Total eosinophile count was 63. Three hours following an injection of 0.3 mg. of epinephrine in 200 cc. of saline, the eosinophile count dropped by 80%.

The boy was last examined at the age of 14 years. Then there were no signs of genital development, neither pubic hair, penile growth, nor change of voice. In spite of the wide range of normal variations, rapid growth of testicles and penis is usually encountered at that age in the majority of boys.

X-Ray Studies.—At the age of 10 years all the carpal bones were calcified except for the navicular bone. However, according to Todd's [2] standards the shape of the bones was immature and consistent with an age of about 6 years. The distal epiphyses of both radius and ulna were present. There was some retardation in development of the proximal radial epiphysis. There were bilateral "pseudoepiphyses" on the proximal end of the second metacarpal, the distal end of the first metacarpal * and the proximal end of the fifth metacarpal, the latter being less pronounced (Figs. 1 and 2).

At the age of $11\frac{2}{12}$ years the two navicular bones were present; otherwise there was no change in maturation. The bone age corresponded with a standard for 7 years 3 months, which indicates underdevelopment for the given chronological age. At the age of $11\frac{7}{12}$ years there was still no change in maturation.

The cardiac contour appeared abnormal. The prominence of the pulmonary vascular markings suggested that there might be a mild left-to-right shunt, such as a ventricular septal defect.

X-ray films of the skull showed no evidence of increased intracranial pressure or pathological intracranial calcifications. The sella turcica was normally outlined.

Examples of x-ray films of the wrist of other cases of our series are shown in Figures 3, 4, 5, and 6.

* In Todd's "Atlas of Skeletal Maturation" [2] of normal individuals pseudoepiphyses at the distal end of the first metacarpal can be seen in some of his tables and might be interpreted as an insignificant normal variant.

Fig. 1 (Case 4).—At the age of 10½12 years. Bone age 6¾12 years. Bilateral "pseudoepiphyses" of second metacarpal.

Fig. 2 (Case 4).—At the age of 11¾12 years. Bone age 7¾12 years.

Fig. 3 (Case 5).—Right hand at the age of $5\frac{11}{12}$ years, bone age 3 years; left hand at the age of $7\frac{10}{12}$ years, bone age about 5 years. Bilateral "pseudoepiphyses" of second and fifth metacarpal.

Fig. 4 (Case 8).—At the age of $6\frac{7}{12}$ years. Bone age 3 years.

Fig. 5 (Case 9).—At the age of 1 6/12 years. Bone age 6/12 years, "pseudoepiphyses" of second metacarpal.

Fig. 6 (Case 11).—At the age of 3 7/12 years. Bone age 1 9/12 years, fracture-like "pseudoepiphyses" of second metacarpal.

COMMENT

The syndrome described in this study seems to have a predilection for males, since 10 of the 11 cases are boys. The triad of dwarfism, retarded skeletal maturation, and a heart murmur constitutes the inherent pattern of the syndrome. Sexual infantilism has occurred in the three patients who have reached the age of puberty. As in other syndromes with multiple congenital anomalies in childhood, other stigmata, particularly mesenchymatous in origin, occur frequently, but not regularly. In this particular syndrome one of the other stigmata is a peculiar skeletal anomaly, bilateral "pseudoepiphyses" on one or more of the metacarpal bones. They are present most frequently on the proximal end of the second metacarpal and less often on the proximal end of the fifth metacarpal.

At the time of the first observation the age of the children varied from 18 months to 10 years. The majority were referred because of dwarfism, never because of complaints referring to the heart. In Case 4 the admission diagnosis was cryptorchidism and adiposogenital dystrophy. In another case the parents became concerned because the child was overtaken in height at the age of 8 years by his 5-year-old brother.

Retardation in growth was apparent in early childhood in all cases in which sufficient data were avaliable for comparison. All of the patients were considerably below the expected height for their age group. The deficit amounted to about 7.8 cm. in the younger children, to 33.8 cm. in the older boys. As is to be expected in congenital anomalies, the body proportions remained infantile. The weights were either above or coincided with the weights for height.

Skeletal maturation, measured by the ossification of the carpal bones, was considerably retarded in all cases. According to Todd,[2] the development of the ossification centers in the wrist was behind that of the chronological age by one to four years. There was skeletal immaturity not only as to the number of calcified ossification centers but also as to shape and contours of the structures involved. In some instances asymmetric and disharmonic development was observed similar to the irregularities of bone maturation in congenitally malformed children, which were recently reported by Seckel.[3]

The mental development of the children was essentially normal. Gross mental retardation occurred in only one instance (Case 7). Also, one child had difficulties in school (Case 2). The rest of the children of school age showed good progress. They were only handicapped by their dwarfism and suffered occasionally from inferiority feelings.

An exact explanation of the heart murmur cannot be given. None of the patients had clubbing, were cyanotic, or revealed any signs suggestive of congenital heart disease, except for the systolic murmur along the left border of the sternum, best heard in the third intercostal space. Coarctation of the aorta can be ruled out. There is no difference of blood pressure in the upper and the lower extremities. A subaortic stenosis cannot be excluded, however, the absence of a thrill is not in favor of this anomaly. A mild pulmonary stenosis is not impossible. The most likely diagnosis is an interatrial or interventricular septal defect, particularly since in one of our cases (Case 4) the x-ray picture was suggestive of a mild left-to-right shunt. The incomplete right bundle-branch block in this case is not diagnostic. In some of the cases the murmur had a harsh, rasping quality. A more exact diagnosis could be established by catheterization and angiocardiography or arterial blood oxygen saturation studies. However, since the first two procedures have certain dangers, they were not considered indicated.

The problem of "pseudoepiphyses" and their significance has been controversial for a long time. At the present time most investigators agree that they are not identical with genuine epiphyses and may not be considered accessory independent ossification centers and hence a normal variant. Pfitzner [4] coined the term "pseudoepiphyses" and developed the concept that they are the result of a disturbance of ossification. These struc-

tures are occasionally only partially separated from the diaphyses (Cases 7 and 11 and Fig. 6) and may even simulate a fracture. On x-ray, there seems to be no cartilage between the diaphysis and the pseudoepiphysis as in the case of a true epiphysis; the intermediary substance shows clearly spongiosa structure. In our material pseudoepiphyses were observed in 9 of the 11 patients.

According to Schinz and co-workers [5] a pseudoepiphysis differs from a genuine epiphysis by its early appearance and rapid growth, precocious coalescence with the diaphysis taking place precipitately. Its center of ossification appears in the second and third year of life and coalesces with the diaphysis by the sixth to seventh year. After the 15th year of life the structure merges completely with the diaphysis.

The question remains open whether or not there occur genuine accessory epiphyses as a normal variant in some instances and "pseudoepiphyses" as part of the diaphysis in other instances. We have observed in one case of acute lymphatic leukemia what may be considered an accessory epiphysis separated from the diaphysis by cartilage and not attached to the diaphysis by a bridge of osseous tissue. This might still be an earlier stage of development before fusion takes place. There are not enough observations available on one and the same case with close follow-up over many years. Exact figures are not available regarding the incidence of "pseudoepiphyses" in normal children. Caffey [6] mentions the occurrence of accessory ossification centers as a normal variant, without statistical data as to their incidence.

A relation between the presence of pseudoepiphyses and endocrine or developmental anomalies has been emphasized by several investigators. They have been seen in Mongoloids, in cretins, in cases of sexual infantilism, particularly in conditions characterized by retarded growth and development. Rochlin [7] called attention to a linkage with genital hypoplasia and sexual infantilism. We have observed them in gargoylism with a congenital heart lesion, in a case of aplastic anemia with polydactyly and a congenital heart lesion, and even in two children with acute lymphatic leukemia and in one with Mediterranean anemia, in all instances on the second metacarpal. In our opinion pseudoepiphyses are not a characteristic of one specific entity, but a group characteristic in anomalies with disturbances of skeletal development. They have the same significance as the skeletal stigmata in other conditions with multiple congenital anomalies, as for instance the deformity of the middle phalanx in Mongolism or a radioulnar synostosis.

Because of the missing extragenital sexual characteristics and the retarded testicular development in the three children who reached the age of puberty, two endocrine disorders—pituitary dwarfism and primary hypogonadism—must be considered. In view of the age group of our patients—8 out of 11 are below the age of puberty—it is difficult to be sure whether or not the pituitary gland and the gonads are structurally and functionally normal organs. It is possible that the carriers of the syndrome suffer from a deficit of the eosinophile cells in the anterior lobe of the pituitary gland. However, there are certain features as well as laboratory findings which are not in favor of such an assumption. Pituitary dwarfs are usually more retarded in skeletal maturation, and their facial features are rather characteristic, even early in life. In none of the cases are there any clinical signs suggestive of anatomical changes of the pituitary gland or the structures in its immediate vicinity. There is no diabetes insipidus, no narrowing of the visual fields, and no obesity of higher degree. The testicles although small in size are normal in consistency and less undifferentiated than in pituitary dwarfism. In Case 1 beginning growth of pubic hair was noticed at the age of 13 years 2 months. The 17-ketosteroid excretion in Cases 1 and 2 does not support the diagnosis of pituitary dwarfism. In Case 1 it amounted to 7.1 mg. in 24 hours at the age of $13\frac{2}{12}$ years, in Case 2 to 5.42 mg. in 24 hours at the age of $15\frac{6}{12}$ years. Also, the other laboratory findings in

Case 4 are not consistent with pituitary dwarfism. Testicular biopsies were not carried out. Another important fact in favor of our cases representing an independent entity is the presence of the heart murmur. It would be a strange coincidence to see 11 pituitary dwarfs with heart murmurs.

The second differential diagnostic consideration is a primary hypogonadism, analogous to ovarian agenesis in the female. However, F. S. H. excretion in the urine of Case 4 is negative, and extragenital sexual characteristics are missing. Since Cases 1 and 2 exhibited finally signs of sexual development, we are justified in assuming that this patient is also probably a case of "delayed adolescence."

There is no evidence of lowered thyroid functioning in our patients. Not only were there no clinical signs of myxedema, but also the uptake of radioactive iodine in Case 4 was within normal limits, and the prolonged administration of thyroid extract was unsuccessful in attempts to correct the developmental retardation of Cases 1, 2, and 5.

SUMMARY

A syndrome which is characterized by dwarfism, retarded skeletal maturation, a congenital heart murmur, and sexual infantilism in the older carriers has been observed in 11 cases, 10 boys and 1 girl. A frequent finding is the presence of bilateral "pseudoepiphyses" at the proximal end of the second metacarpal. There is no evidence that pituitary deficiency, primary hypogonadism or hypothyroidism or an anomaly of the heart is the primary cause of the retarded development. The dwarfing can be explained best as a genetic defect which happens to be linked with other genetic defects to constitute a syndrome.

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Dr. Hans Aaron, Dr. Harvey White, and the Children's Memorial Hospital, Chicago, gave permission for use of the case history and the x-ray films of Case 5.

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A Duosyndrome of the Laryngeal Nerve

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Posture in utero can be responsible for changes other than the ones of bone which have been so long recognized. Blood vessels can be affected by posture. The pressing of one fetal part upon another may affect them, as may continued contact against the uterine wall, and, rarely, a blood vessel may be so altered in its course by the extension of a leg, for example, after birth, which had been held in a rotated position, as to kink the vessel. Paralysis, too, can result from posture, through direct pressure on a nerve, perhaps, or certainly through interference with its blood supply.

Most nerves are protected from pressure by their location within the body. The laryngeal nerve is an exception to this. Its branches are peculiarly vulnerable to damage from posture because they enter the larynx through narrow spaces between movable cartilages and bones. One enters above and the other below the thyroid cartilage, which can be brought into contact with the hyoid bone or the cricoid cartilage by lateral flexion of the head. Since this one position can result in either of two symptom-complexes, it seems to constitute a duosyndrome of the laryngeal nerve.

Postural effects can occur at any age after birth, and since the same laws must apply to the unborn as to the born, they probably can occur at any age before birth as well. Those that are called "positional defects," "effects of uterine pressure," and by similar names are the more conspicuous results of prolonged continuation in one posture. All fetal posture might well be said to be "passive posture," since the fetus can maintain it only with the assistance of the uterine wall. In "passive posture" great pressure of the uterus on the fetus is not implied. Instead there only is a steady and firm support about his body. This holds him closely and continuously in a posture which once established cannot vary in any of its essentials until he leaves the womb.

This tight surrounding by the uterus does not begin at once on implantation. At first, at least under normal circumstances, the unborn floats about freely, but he grows at an entirely different rate from that at which amniotic fluid is formed.

His growth is on an exponential curve. It seems slow at first, in terms of weight or size, but after midgestation its rise is fast and striking. He increases from the one original ovum to about 10,000,000,000 cells. To reach this number only as many cell divisions are required as the number of weeks of his gestation. These figures suggest the ratio of his growth but it must not be assumed that his progress is exactly by geometric progression.

The amniotic fluid around him increases on another curve entirely. Its maximal volume is thought to be reached at midgestation (1800 cc.). At term it is nearer 800 cc. These absolute volumes are interesting because they indicate an ability of the uterus to resorb the fluid, but for this study it is the relative volume of the fluid compared to that of the embryo and fetus which is important.

In early gestation the embryo with its budding limbs has eight- to tenfold its own

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volume in which to move around. This allows its unlimited motion. At midterm the fetus has only twice his own volume of space for free movement. He has lengthened, and his back can now rest against one side of the uterine cavity, and he can push against the other side with his feet. It is in this beginning restriction of his activity that his mother first "feels life."

Fig. 1.—All fetuses must adapt themselves to their crowded circumstances. Fewer than 25% are in the "normal" fetal posture of straight anterior flexion. The others show some results of their posture. Although these results are almost all of negligible importance, they explain minor aberrations. A few are severe in the degree of the deformity and may even be lethal.

After midgestation he grows rapidly, while the amniotic fluid diminishes in amount. At term he occupies three-quarters of the space within the uterus. The fluid around him must fill everywhere between him and the uterine wall and so is not all, little as it is, available for movement (Fig. 1).

Outside the containing sac lies a vigorous muscle a half-inch or more thick. While it contained the embryo the sac was spherical. It remained so until it became distended from roundness by the enlarging fetus, but the tone of the muscle and its contractions keep him as ball-like as it can.

As a result of the limited amount of space and the tonicity and strength of the muscle surrounding him, the fetus becomes more and more huddled as he grows, and the posture he chances to fall into is the posture in which he must remain until delivery. He is not motionless. In his pint of space he can move an unencumbered foot or a hand without restriction, but a tilted head must remain tilted, and there is not room to uncross crossed feet nor to unfold folded arms.

His neck and extremities are not strong enough and are at too great a mechanical disadvantage to push aside the uterine wall for more than a moment and a short distance. Since the cavity is not expansile, because it contains fluid, the pushing out at one point means the pulling in at another. The fetus can, however, alter his position in relation to his mother's. His back muscles are at good advantage and, using these, he can change around within her without changing the fundamentals of his own posture (Fig. 2).

He learns to accept and to prefer this passive posture even after he's born. This preference makes it possible to determine the intrauterine posture for every baby. When he is "folded" into as near a sphere as possible he resumes his fetal position, and in it he falls off to sleep immediately no matter how distorted he may appear to be. Prenatal x-rays have substantiated the impression that this is the case.

"Folding" many babies gives the impression that the number of them who lay in the conventionally accepted fetal posture of straight anterior flexion is less than one-quarter of their total. Deviations from this position can be detected in hands, feet, arms, legs, ribs, heads, and elsewhere. Most of these go unnoticed and are of little consequence, but all of them are interesting,

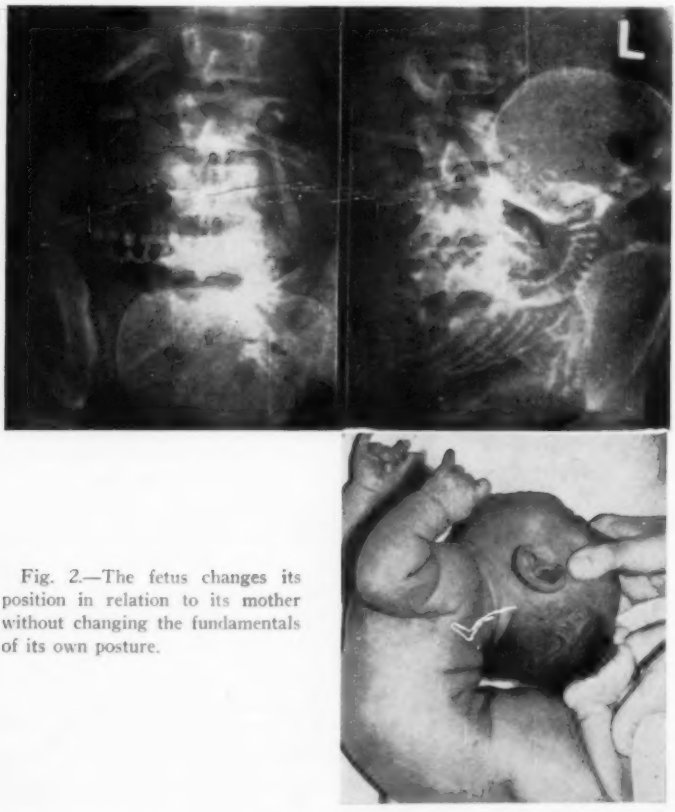


Fig. 2.—The fetus changes its position in relation to its mother without changing the fundamentals of its own posture.

and a great variety of minor anatomic aberrations can be explained by this simple maneuver; differences of foot conformation, for example, and many others of this degree, as well as some more serious conditions.

Among the common variants in posture is one where the fetus has turned his face away from the midline before his head was forced into flexion on his chest (Fig. 3). In this posture one side of his face is exposed to constant contact with the uterine wall. This unavoidably immobilizes it to some degree and affects the circulation through it. On the opposite side, the neck is kinked, and the position of the thyroid cartilage is changed in its relation to the cricoid cartilage and the hyoid bone.

The thyroid cartilage is not fixed but is a rigid body which can be moved up and down. Between it and the hyoid bone above it the superior branch of the larygeal nerve and its blood supply enter the larynx from the side. Between the thyroid and the cricoid cartilages the recurrent branch of the same nerve enters from the same direction (Fig. 4).

Lateral flexion of the head forces approximation of these rigid structures and compresses one or both branches of the

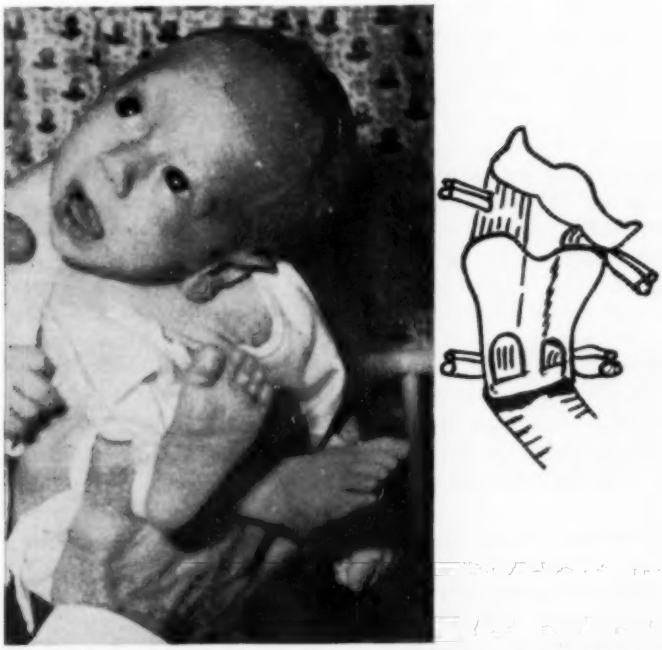


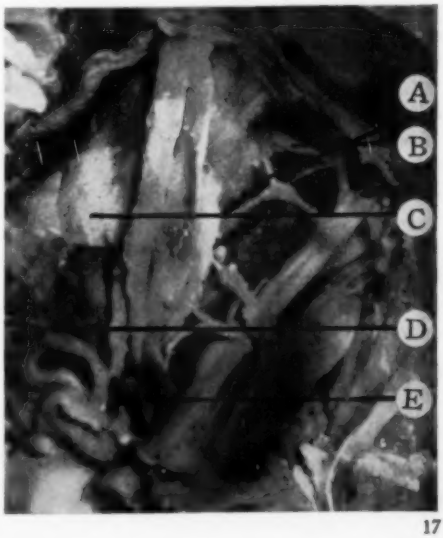
Fig. 3.—Lateral cephalic flexion of severe degree has paralyzed this infant's face on the right and his vocal cord on the left. He is shown in his "position of comfort." The diagram illustrates how either the recurrent or the superior branch of the laryngeal nerve and vessels can be compressed by this fetal posture.

nerve or, importantly, their blood supply. This one posture can cause either or both of two results—dysphagia and/or dyspnea, depending on which branch of the nerve has been involved. It is these two symptom-complexes from one cause which makes this a duosyndrome of the laryngeal nerve.

The clinical picture in both cases is one in which the infant prefers to hold his head turned away from the midline and one side of his face is weak or paralyzed. In the case of involvement of the recurrent nerve, accompanying this unilateral weakness is a weakness or paralysis of approximately the same degree of the contralateral vocal cord. The signs are of dyspnea, inspiratory tug, and stridor.

Direct laryngoscopic examination accounts for the impairment of the airway and establishes the diagnosis. The epiglottis can be seen to sag and the larynx to have a relaxed aryepiglottic fold on the weak side. The

Fig. 4.—Dissection of the neck in lateral cephalic flexion. *A*, superior laryngeal artery. *B*, superior laryngeal nerve. *C*, thyroid cartilage. *D*, trachea. *E*, recurrent laryngeal nerve and vessels. In this position the spaces for entrance are closed.



voice may be normal, hoarse, or absent, depending upon the degree of weakness.

The symptoms are usually not evident at once, but in the severe instances they appear within a few hours. In the milder ones they may not be noticed for several days. In the severe degrees of recurrent nerve involvement the diagnosis of hyaline membrane has been made, and it can be ruled out only by direct examination of the larynx and, sometimes, by an earlier onset of symptoms. Congenital laryngeal stridor cannot be ruled out, as this condition is definitely in that category, but there may be other stridors of other natures. The long familiar redundant aryepiglottic fold and sagging larynx are part of this picture, though again these may be caused by other and unknown causes as well.

When the superior branch is involved there is difficulty in deglutition. This nerve is largely sensory, and a complete muscular paralysis probably never results from its compression. Swallowing is difficult, however; sometimes difficult enough that in infants with this condition the diagnosis is tracheoesophageal fistula. The esophagus seems to have lost much of its tone in many instances, and easy regurgitation and air-swallowing results. Fluoroscopy establishes the diagnosis by demonstration of aspiration of radiopaque liquids.

A comment might be inserted that the unilateral facial weakness seen in a high percentage of infants is probably accounted for by this intrauterine posture. The weakness is slight in most and disappears within a few months. Meanwhile these infants are likely to be noisy breathers and will gurgle, especially at rest, and will regurgitate readily.

The picture in very severe degrees of lateral flexion may be complicated by pressure on the phrenic nerve, resulting in a paralysis of one side of the diaphragm, and presumably other evidences of pressure might occasionally appear.

The treatment for both types is symptomatic. Tracheotomy and tube-feeding may be required. Laying the infant prone with his head toward the shoulder opposite that of his preference sometimes substantially relieves his breathing, and feeding him with his head toward the preferred side seems to facilitate swallowing.

The prognosis varies with the severity. The noisy breathing may last a year or longer, as may the danger of aspiration. Those totally paralyzed are likely to remain so, but recovery within the second half year is to be expected for all the others.

This is a simple physiomechanical explanation of some common problems which too often have been called intrauterine or congenital polio, or have had some more stigmatizing label attached to them. It is of importance that this simple explanation by posture is psychlogically acceptable to the family.

Embalming in lateral cephalic flexion and dissection were performed by Dr. M. Kostowiecki, through the courtesy of Dr. O. V. Batson, Anatomy Department, Graduate School of Medicine, University of Pennsylvania.

A Rapid Micromethod for the Determination of Indirect Bilirubin

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Since the indictment of bilirubin as an etiologic factor in the development of kernicterus, widespread attention has been focused upon neonatal jaundice. Frequent bilirubin determinations are now being done on small infants, and a micromethod that obviates the necessity for venipunctures and at the same time can be easily performed would seem desirable. Because the bilirubin producing icterus in the first week of life, associated with erythroblastosis, sepsis, or prematurity, is almost entirely indirect-reacting, a simple method for determination of indirect bilirubin alone should be of practical value. Such a method, based on that originally described by Ernst and Förster [1] and modified by Weech and co-workers * in 1941, is now in use at the Children's Hospital. The addition of acetone to serum precipitates direct bilirubin together with protein and leaves indirect bilirubin in the clear yellow supernate, where its concentration can be determined photometrically.

As described by Davidson, Merritt, and Weech,[2] 0.1 ml. of serum was delivered into a centrifuge tube containing 0.5 ml. of distilled water. An amount of 2 ml. of acetone was added, with thorough mixing. The mixture was then chilled for 15 minutes in the refrigerator, centrifuged in an ice bath, and its optical density determined in a special photoelectric colorimeter. Solutions were placed in covered containers when standing, to prevent deterioration of indirect bilirubin by light. Refrigeration was carried out in order to prevent the appearance of turbidity.

The present method was evolved in an attempt to simplify and adapt for general clinical use the procedure employed by Weech. The problem of turbidity appears to have been overcome without recourse to refrigeration, and exposure to light, unless extreme, was found to have little influence on the readings.

EXPERIMENTAL

Reagents.—An 80% acetone solution, made by mixing four parts of acetone with one part of water.

Procedure.—With a pipette calibrated "to contain," 0.1 ml. of fresh serum is added to 2.5 ml. of 80% acetone and the pipette rinsed several times with the acetone mixture. The solution is then mixed with a glass stirring rod and centrifuged at 2000 rpm for five minutes. The precipitate which forms is yellow when the concentration of direct bilirubin is greater than 3 mg. per 100 ml. or white at lower concentrations. After centrifugation the supernate is transferred to a Coleman microcuvette (10×75 mm.) and the reading taken in a Coleman Jr. Spectrophotometer at a wave length of 460mμ. A second curvette, containing only 80% acetone, serves as a blank. The optical density value is converted to concentration of indirect bilirubin by referring to a standard curve.

Standardization of Method.—To ascertain the relationship between optical density and

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* References 2 and 3.

concentration of indirect bilirubin, determinations on the same sera were made by the acetone method and by the van den Bergh reaction. For the van den Bergh reaction the method of Malloy and Evelyn [4] was employed, with reading of the direct bilirubin 1 minute after diazotization, and the total, 30 minutes after addition of alcohol. The optical densities obtained by the acetone method were then plotted against the concentration of indirect bilirubin determined by the diazo method. The results of paired determinations on 50 serum samples are shown in Figure 1. The solid circles represent 40 serum samples in which direct bilirubin constituted less than 16% of the total, and the open circles, 10 samples with direct bilirubin constituting more than 28% of the total. The presence of direct bilirubin appears not to interfere with the determination of indirect bilirubin by the acetone-precipitation method. The scatter of some of the points may be accounted for by the occasional presence of hemolyzed blood in the serum specimen. Hemolysis interferes with the diazo reaction but appears to have no effect on the acetone-precipitation method.

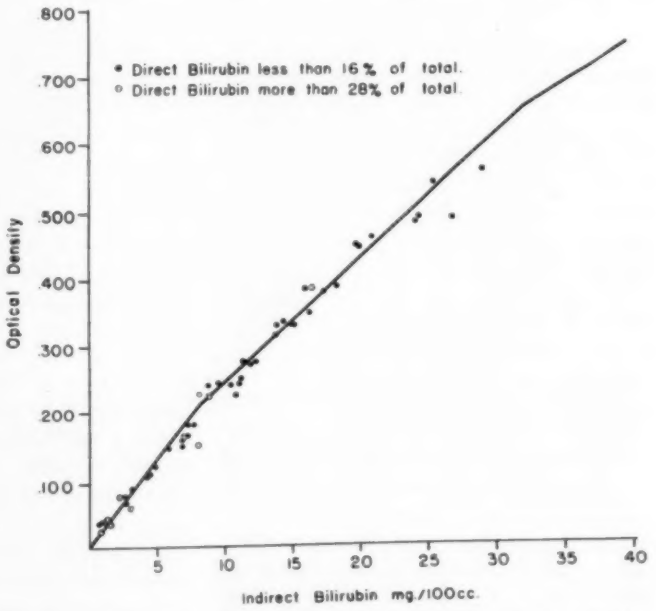

Fig. 1.—Optical density of supernatant fluid obtained by acetone precipitation method plotted against concentration of indirect bilirubin determined by the diazo reaction (Malloy and Evelyn [4]). The configuration of the line fitted to the points was determined from the density of solutions of commercial bilirubin.

In order to determine the actual shape of the calibration curve, solutions of commercial bilirubin were employed.† From a fresh stock solution containing a few milligrams of commercial bilirubin dissolved in 0.1 M Na_2CO_3, four working standard dilutions (also in 0.1 M Na_2CO_3) were made. Aliquots of the various working standards were then added to acetone by the same procedure as for serum, and the optical densities of the mixtures at 460mμ were plotted against the working standard dilutions expressed as per cent of the stock solution. The resulting commercial bilirubin curve was then superimposed upon that of the serum values (Fig. 1) by arbitrarily selecting a value for optical density and determining from each curve the corresponding abscissa values for serum indirect bilirubin in milligrams per 100 ml. and in per cent dilution. From the latter values, a factor for converting per cent dilution to concentration of indirect bilirubin was obtained. Further adjustment

† Manufactured by Pfanstiehl Chemical Corporation, Waukegan, Ill. According to the study of Najjar and Childs,[5] commercial bilirubin is indirect-reacting.

of the curve was made by ascertaining the average deviation of serum values from the commercial bilirubin curve and changing its position accordingly.

Turbidity.—In early work with the method the procedure described by Weech and coworkers ‡ was used. Serum was introduced into water and the acetone added later. With this procedure turbidity was observed in approximately 20% of the determinations. By the techniques employed refrigeration of the reagents and of the supernatant fluid appeared to have little effect in preventing turbidity. Later, with simplification of the method by introducing serum directly into 80% acetone, turbidity was not observed in 60 consecutive determinations. It would appear that by avoiding the introduction of serum directly into water the problem of turbidity has been eliminated.

Effect of Light.—Exposure to light increases the density of acetone solutions of indirect bilirubin, but the effect appears to be negligible unless exposure is extreme. Comparisons of changes in density with time, with and without light exposure, were made. Serum-acetone mixtures, prepared under fluorescent lights next to an unshaded window (out of direct sunlight) and allowed to stand under these conditions after centrifugation, were compared with solutions prepared in subdued light and placed in stoppered tubes covered by a towel after centrifugation. No appreciable change in density occurred in solutions not exposed to light. On the other hand, within 10 minutes of centrifugation solutions exposed to light had increased in density by an amount equivalent to 0.2 mg. of indirect bilirubin per 100 ml. of serum and, after 20 minutes, by an amount equivalent to 0.9 mg. per 100 ml. The observations emphasize that extreme exposure to light should be avoided, but that under ordinary lighting conditions with reasonably prompt reading after centrifugation the error from this source will be slight.

‡ References 2 and 3.

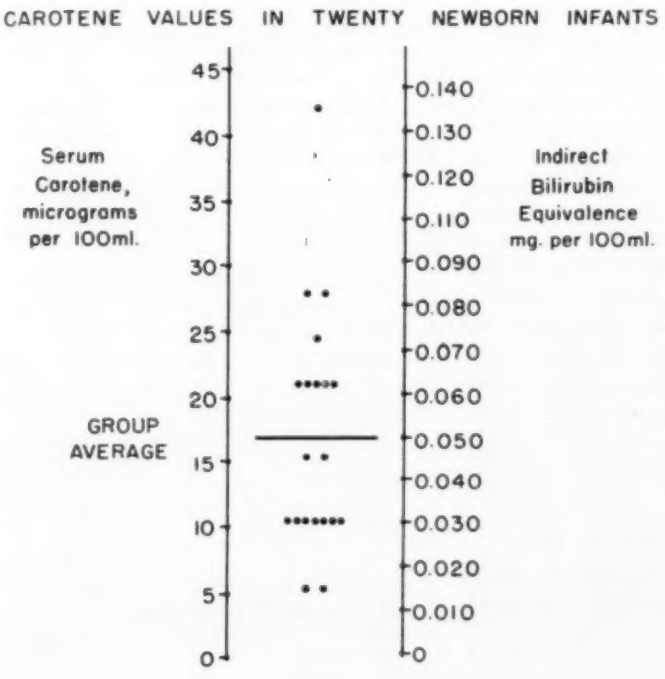

Fig. 2.—Serum lipochrome levels expressed as carotene (left ordinate) and their color equivalence as indirect bilirubin (right ordinate) in 20 newborn infants. The horizontal line indicates the average value.

Interference by Carotene.—Since carotenoid substances in the plasma are not precipitated by acetone, the presence of a high serum-lipochrome concentration may falsely increase the bilirubin value. Davidson, Merritt, and Weech have previously indicated that levels of lipochrome in the plasma of newborn infants are quite low.[3] In the present study lipochrome determinations were done on 20 infants less than one week of age in the newborn nursery at the Cincinnati General Hospital. Serum was mixed with $CaSO_4$, alcohol was added, and the lipochrome was extracted in petroleum ether.§ The results recorded in Figure 2 agree in general with those previously reported. The highest value obtained was 42γ per 100 ml., which, when expressed as bilirubin, was only 0.125 mg. per 100 ml. The remainder fell below 30γ per 100 ml. and would have caused an apparent increase of less than 0.09 mg. per 100 ml. in the bilirubin results. In newborn infants, therefore, correction for the presence of lipochromes would not be necessary in the determination of indirect bilirubin by this method.

COMMENT

The method described appears to have overcome several of the features which made the procedure described by Weech and coworkers somewhat cumbersome. By overcoming the problem of turbidity, the precaution of chilling of the solutions and supernatant fluid is no longer necessary. Likewise, errors resulting from exposure to light seem to be sufficiently small so that strict avoidance of light during the procedure is not necessary. The small amount of serum required greatly enhances the value of the procedure as a quick and accurate means of following the progress of jaundice in the newborn infant. For a more complete assessment of the icterus, occasional determinations of direct bilirubin by the method of Malloy and Evelyn [4] or by the micromodification of this method described by Hsia, Hsia, and Gellis [7] may be done. Practical experience with the method in the clinical laboratory has shown that it can be readily performed in emergencies at odd hours by relatively unskilled personnel. To save time, corked centrifuge tubes containing the required amount of acetone mixture can be prepared beforehand, so that the only steps involved are the pipetting and mixing of serum, centrifugation, and colorimetry.

SUMMARY

A simple and rapid micromethod for the determination of serum indirect bilirubin based on that originally employed by Weech || is described. The method depends on the precipitation of protein and of direct bilirubin by acetone, allowing indirect bilirubin to be determined colorimetrically on the supernatant fluid. Because carotenoid pigments, also soluble in acetone, interfere with the determination, the method is of greatest value in newborn infants, an age group in which it has been demonstrated that serum lipochrome levels are low.

Dr. Carl A. Koch granted permission to use the facilities of the newborn nursery of the Cincinnati General Hospital in obtaining blood specimens, and Mrs. Mary Rose Hausman and Miss Rita Dixon gave technical assistance.

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Progress in Pediatrics

BREATH-HOLDING SPELLS

A Review of the Literature and Eleven Additional Cases

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BREATH-HOLDING spells are defined as a temporary interruption of respiration at the end of the expiratory phase, leading to mild cyanosis, unconsciousness, or convulsive seizures of either a tonic or clonic nature. In their developmental sequence there is at first crying, then a long, sustained expiratory cry without a succeeding inspiration; cyanosis replaces the previous flushing of the face (although sometimes pallor is more marked than cyanosis); then there is a stiffening of the limbs, usually in extension, followed by loss of consciousness, relaxation, inspiration, and, in a short time, recovery. In some cases, loss of consciousness is followed by generalized clonic movements of the extremities. In nearly all cases, the precipitating factor is either injury or frustration and the resulting anger, or a combination of both.

The spells are said to be an early infantile form of temper tantrum—a primitive expression of anger or frustration. Such being the case, it is not surprising to find them occurring most frequently in the last half of the first year and during the second year of life. They are extremely rare beyond the age of 5 years, although there are probably no completely accurate figures to be had on this point, since many cases never get to a doctor or a clinic, being handled by intrafamilial disciplinary means.

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HISTORY AND ETIOLOGY

The literature on breath-holding spells is relatively meager, and there is a good bit of confusion in the older references between breath-holding spells and other forms of respiratory arrest. The earliest reference to be found is that of Barthez and Rilliet,[1] who felt that it was impossible to differentiate the "suppression of breathing with accompanying suffocative inspiration that presents itself frequently in angry children from spasm of the glottis." They recognized that the attacks frequently ended in an "epileptic seizure," but felt there was no need to differentiate them from "inward convulsions" (their term for spasm of the glottis related to tetany), as the history of preceding anger was sufficient to distinguish the two entities.

Reference is also made to breath-holding spells by Meigs,[2] who cites the above authors [1] and who gives a description of the affection to which we can add but little 100 years later. He felt that the condition is "a sudden spasm of all the respiratory muscles" and differentiated it from laryngeal stridor and tetany. He ascribed it most commonly to contradiction, but stated that "fright, pain, or crying" could also cause it. He felt that it was connected with dentition in children of nervous temperament.

Bull,[3] in 1853, advised mothers to "plunge the hand, or both, into cold water; this will induce gasping or sighing, and so the breath will be drawn."

Smith,[4] in 1869, felt that breath-holding spells probably were best classified with laryngismus stridulus, tetany, and spasm of the glottis, but differed from them in that he believed the primary spasm in breath-holding

spells was of the diaphragm, and hence no stridor or "croup" was present.

In the early part of this century there was much interest in these "affect seizures," particularly among the German writers. Neumann,* in 1905, was one of the first to distinguish clearly between breath-holding spells and laryngismus stridulus (tetanoid laryngospasm), although Feer,† in 1911, was apparently still in some doubt as to the separation of the two entities. It was Ibrahim,‡ in 1911, who coined the term "respiratory affect spasm" to denote clearly the psychogenicity of such spells.

In the light of these writings which show a tendency toward an acceptance of the effect-determination of breath-holding, it is surprising to find Muskens [8] as late as 1928 feeling that there was some connection between breath-holding spells and spasmophilia, apparently confusing the two in a case which he cites.

Abt [9] felt that the spells were the result of a tonic spasm of the inspiratory muscles in "neuropathic" children, triggered by fright, pain, frustration, and the like.

Not much was added to the theory of causation or to the concepts concerning the site of the basic spasm until Peiper [11] (in 1939) showed, by tracings of the respiratory movements of a child during breath-holding spells, that there were diaphragmatic excursions without inspiration. He concluded from this that there must be, therefore, a spasm of the glottis.

The majority of the more recent writers on the subject accept the emotional basis of the disorder, but there is a fertile field for speculation as to why this symptom, rather than another, comes to express the emotional disturbance.

Wile [12] stated that a conflict results when the desire for "uninhibited physical movement" is met by "social pressure for quietness and inactivity" and that this conflict increases with the growth of the child and with the "development of individualism of personality." He felt that this conflict was the basis for the negativism of the children, ranging from "mild irritation or resentment to violent breath-holding reactions," and is an "aggressive physical response to social demand or restraint." Further, he says, "rage accompanies the frustration of desire, and a sense of insecurity or fear for position encourages tantrums, destructiveness, or episodes of breath-holding." (In this connection it is interesting to note that Clark,[13] writing on epilepsy, said that ". . . the seizure phenomenon in essential epilepsy is a direct outcome of the inability of such persons to subordinate their individualistic tendencies to those of the so-called social demands and constitutes a reaction away from the difficulties in a loss of consciousness.")

Kanner [15] says that the spells are "usually one of several signals of a disturbed parent-child relationship" and are often found with oversolicitous or overprotective parents and/or infants who are generally resistive, especially to too early or too stringent habit training.

There is some feeling that a hereditary factor exists, and many of the earlier authors attempted to show a connection between emotionally unstable parents and breath-holding spells in their children (Abt, Ibrahim, Neumann, and others). In 1928 Levy and Patrick,[16] and recently Penfield and Erickson,[17] undertook studies to show the relationship between infantile convulsions, head-banging, temper tantrums, breath-holding, and other recurrent disorders to recurrent fainting or headaches (migraine?) in the parents.

In the light of present day concepts, however, environment would seem to be the more important factor, as it is the disturbance in the parent-child relationship or the frustration of the child by his emotional milieu that appears to be the basis for the spells. It cannot be denied, however, that a predisposition is inherited; but even were this true, the predisposition would not be too likely to gain expression if the environment were good.

* Neumann,[5] cited by Kanner.[15]

† Feer,[6] cited by Kanner.[15]

‡ Ibrahim,[7] cited by Kanner.[15]

A theoretical approach to the causation of the spells from the psychoanalytic point of view is that there is a disturbance of the autoplastic-alloplastic balance. In early infancy most of the libido or psychic energy is involved in moulding psychic structures within the individual—this is autoplasty. At a later stage there is a redirection of the psychic energy outward toward other people and things. This objectivation necessitates adapting the energy to the environment—this is alloplasty. In the infant and young child there is a preponderance of autoplasty, but still a definite tendency toward alloplasty. If the environment and/or the people toward whom the biological energy is being redirected is such that this energy is not easily adapted, the child reconverts it to psychic rearrangements within himself. Hence the energy may be diverted to the service of changing the internal organization at a more primitive level.

According to Erikson [18] the earliest stage of psychosexual development, the oral incorporative stage, that stage in which the child derives the greatest amount of gratification of his impulses by receiving stimuli brought into his field of sensations and incorporating them by taking them into his mouth, is not only oral, but "oral-respiratory-sensory." Erikson feels that although the focus is on the oral sensations, all the other zones and the entire skin surface as a sensory organ are involved in receiving and incorporating stimuli.

Therefore, in retreating to autoplasty, the child who is unable to adapt his drives to his environment has a choice of rearrangements in which to dissipate the unadapted energy. He can involve either alimentary functions (oral), respiratory functions, or skin functions (sensory). The reason for the final choice of system is not clear, but this theoretical approach suggests some interesting possibilities in the interrelationships of breath-holding, asthma, eczema, thumb-sucking, and repeated vomiting. These seemingly unrelated entities may all be different somatic expressions of internalization of the psychic energy that has met with conflict in its attempt to adapt to the environment, and this internalization lowers the threshold to the allergens and other external exciting causes.

There is also the highly theoretical concept of whether or not breath-holding spells can be the result of internalization of aggressive tendencies. Ferenczi § states that "the child has to be induced by means of an immense expenditure of love, tenderness, and care to forgive his parents for having brought him into the world without any intention on his part," and "slipping back into non-being" is far easier for the child than for the adult. With this in mind, it is not too impossible to theorize that as a result of conflict between his impulses and his environment, and as a result of hostile and aggressive feelings toward the environment to which the child in his helplessness cannot give adequate expression, the child turns in this rage and seeks, by interfering with the extremely primitive respiratory-regulative apparatus, to escape the entire conflict by slipping into "non-being," or unconsciousness.

Another theoretical point of view is that there is a constant effort on the part of every organism to maintain a physiological balance or homeostasis. A conflict between the individual and his environment produces physiological imbalance experienced as emotional discomfort. Physiological imbalance produces physical dysfunctions, which, if prolonged, may even result in organic pathology. The individual attempts to relieve himself of emotional discomforts and thus regain homeostasis. Breath-holding spells may be an end-organ result in the immature child of a disturbance of homeostasis as the result of conflict with the environment.

DIFFERENTIAL DIAGNOSIS

There should be little or no difficulty in establishing the diagnosis if the history is carefully elicited. The cardinal points to remember are the typical story of onset after a fall or a frightening incident; the repetition following anger, fear, frustration, hurt, and

§ Cited by Healy, Bronner, and Bowers.[19]

so forth. There is also the usual pattern of crying, a long cry held in expiration, pallor or cyanosis of the face, waving of arms, then stiffening, unconsciousness, relaxation, and recovery. In some cases there are clonic movements of the extremities following unconsciousness, particularly if the breath has been held for a longer period than the usual half minute or so. Some children are weak or exhausted after a spell, but most of them seem entirely normal after breathing is reestablished.

As has been mentioned previously, many of the earlier reports confused breath-holding spells with the laryngospasm of tetany, but at the present time it should not be difficult to distinguish the two entities. In laryngospasm one or more of the other signs of tetany is elicitable: Chvostek's, Erb's, or Trousseau's signs, carpopedal spasm, or low serum calcium. Furthermore, laryngospasm is often seen during sleep, whereas breath-holding spells never are. Finally, there is a characteristic inspiratory crow in laryngospasm which is absent in breath-holding.

Congenital laryngeal stridor is to be considered only to be disposed of quickly, as it is usually apparent in the first few days of life, does not have any affect-determination, produces a characteristic inspiratory sound, and rarely persists beyond the end of the first year.

Whooping-cough stridor should not be hard to differentiate, as there are usually other signs of the disease present. There is a definite inspiratory effort at the end of a paroxysm in pertussis, whereas in breath-holding spells, no inspiratory effort is noticeable.

Kanner [15] feels that there is a definite connection between pertussis and breath-holding spells and quotes Bridge and co-workers,[20] who stated:

> . . . pertussis is known to sensitize the respiratory apparatus to certain patterns of response, as evidenced by the recurrence of a pertussis-like cough with succeeding respiratory infections and the frequency of pertussis as an antecedent to asthma in childhood. The repetition of the reaction establishes it as a semi-reflex or pattern.

Epilepsy is one of the diseases most often confused with breath-holding spells and often is the presenting complaint as verbalized by the parents, for example, "the baby is having fits" or "convulsions" or "falling spells." Indeed, the physician often is hard put to differentiate such spells from petit mal or grand mal seizures by history or examination alone, especially in those cases in which the breath is held for relatively long periods, the spells occur frequently, and true convulsive seizures follow the breath-holding. It is well to remember the following points which should differentiate the diagnosis from epilepsy in most cases.

Although epileptic seizures may become intensified and more frequent as a result of emotionally tense situations, they are not always affect-determined, as are breath-holding spells. There is no breath-holding in petit mal spells, but the cyanosis resulting from the tonic spasm of all the muscles of respiration which occurs in grand mal seizures can be confused with breath-holding. However, the typical "cry" of the epileptic, which is due to the forceful expiration through a partially closed larynx, should be rather easily differentiated from the "crying" that precedes breath-holding. In addition to this, the convulsions following breath-holding are usually mild (they are rare sequelae anyway), whereas the grand mal seizure is generally most dramatic. However, in cases where there is real doubt, a thorough study is indicated, including neurological consultation and electroencephalography.

As yet practically nothing is known about the encephalograms in breath-holding spells. The consensus of opinion seems to be that nothing pathognomonic has been shown in those cases which have been reported.

It is interesting to note that several investigators (Bridge and co-workers,[20] Neumann,[8] and others) feel that breath-holding spells may result in epilepsy. Although the number of reported cases which have progressed to epilepsy is small, there is enough evidence of this possibility to warrant considerably more effort in research in this area.

THERAPY

A great number of theories and practices in the treatment of breath-holding spells have been advocated. Meigs [2] felt that a change in environment was helpful in protracted cases but that little need be done in the less severe ones. Bull's [3] method of plunging the hands into cold water has previously been cited. Abt [9] said that the child should be guarded against mental stimulation "of every kind" and should be "ignored as much as possible by parents and friends." He felt that "cold water dashed in the face was a good remedy for the attack," and that, "Finally, the patient should be shown in no uncertain manner that any repetition of the attack will meet with harsh, if not painful, measures." He also said that removal from the home, bromides, or phenobarbital were useful in some cases in addition to "psychotherapy."

As late as 1934, Zahorsky and Zahorsky [21] were advising "calcium salts and even small doses of parathyroid—even when the signs of tetany are absent," showing that laryngospasm and breath-holding spells had not been completely separated even at that time. Potter [22] advocated avoidance of fatigue and over-stimulation and the teaching of self-control. In addition, the child should "spend its time outdoors in the sunshine, and cod-liver oil and iron prescribed, if indicated."

It is hard to correlate the therapy outlined by Sadler and Sadler,[23] amazingly enough published in 1940, with that of other recent writers on the subject. They advised:

> When the child becomes blue in face as a result of holding his breath, the spell may be quickly terminated by a sound spanking or by quickly plunging him into a tub of moderately cold water. One mother always kept cold water in her bath tub for this purpose since it required months of repeated dousing before her girl baby was cured of breath-holding tantrums.

As a basis for the present concepts of therapy for these spells it might be useful to quote Woodcock,[24] who said:

> Tantrums come under the same general heading as aggressive behaviour. The little child's only way of protesting against a frustrating world is by crying and throwing himself around. Anything approaching the same kind of behaviour on the part of the adult who is with him will aggravate the situation many fold. Rest if he is fatigued, food if he is hungry, a change of scene or activity to allow him to drop his conflict without too great a loss of face or feeling of complete defeat—these are aids to the gradual reduction of tantrums rather than their establishment as a habit.

Following the lead of Kanner [15] and many other child psychiatrists, the present treatment is directed toward a solution of the parent-child conflict. The first step toward this is to relieve the parents' anxieties about the possibilities of physical or mental damage from the spells themselves. It is vital that a careful physical and neurological examination be done as a concrete basis for the physician's reassurance. In some cases further laboratory studies may be indicated, such as electroencephalography and serum calcium and blood sugar levels, before other disease entities can be ruled out. We have found that a psychometric evaluation is a helpful procedure in that it is reassuring to the parents if the child is found to be developing normally mentally and of importance to the planning of therapy if the child is retarded.

After reassuring the parents of the harmlessness of the individual attacks and attempting to give them some insight into the emotional basis, the attempt is made, through interviews, to help them modify their own attitudes toward the child and their handling of him. In some cases so managed, improvement becomes apparent after the first few interviews and protracted therapy does not become necessary.

Every effort should be directed toward removing the sources of conflict, such as coercion in eating, overly strict or too early bowel and bladder training, pressure in matter of naps and bedtime, and other premature and excessive demands on the child. Parents should be helped to understand the difference between discipline and punishment and should be given support in establishing a tolerant and consistent disciplinary regime, with the limits set as widely as is consistent with the basic organization of the family and

the household and with the emphasis placed on distraction or diversion of the child when he approaches the limits, rather than punishment.

Frequent severe breath-holding, however, is a symptom of profound insecurity on the part of the child. Feeling both deprived and inadequate, he reacts to frustration with rage which is so overwhelming that he loses control over himself. His inability to experience a satisfying relationship with his parents may be the result of their own emotional disturbances or their own ambivalent or negative feelings toward him. When this is the situation, work with the parents' own emotional adjustment may be necessary. Sometimes a more or less prolonged child guidance therapeutic procedure is indicated if the child's basic emotional foundations are to become adequate for later healthy development.

REPORT OF CASES

Following are 3 cases chosen from 11 seen in the Children's Psychiatric Clinic over the past 11 years. The ones selected are in the following categories: (1) undoubtedly breath-holding spells, (2) breath-holding spells misdiagnosed as epilepsy, and (3) epilepsy diagnosed following breath-holding spells. The other eight cases are briefly summarized and included.

CASE 1.—White boy, aged 2 years 2 months. The onset of the breath-holding spells occurred at the age of 4 months. There were one to two spells a week on the average. He was hospitalized at 7 months for a severe nutritional anemia. The spells were less frequent after the hospitalization. A feeding problem lasting from 3 months of age until 7 months, in which all solid food was refused, disappeared at the time of leaving the hospital. The spells occurred when he was frightened, hurt, or really angry, but minor fustrations did not cause them. The mother had had a normal pregnancy except for an unexplained albuminuria from the third month on. The delivery and developmental history was normal. He was weaned from the bottle without trouble at 8 months. Bowel training was started at 10 months, but he fought it vigorously. At the time therapy was started he would still hide in a closet or behind a door to have his movements, and then would tell his mother about them. The system review was essentially negative. The physical examination revealed nothing abnormal, and the electroencephalogram was normal. The mother and father were living and well, and there was one brother of 4 years apparently normal. The father was majoring in psychology in a part-time college program and was driving a cleaning truck. He was within one year of his A.B. degree and was going to start school full time in a few months. The father's expressed reason for this schooling was to secure a degree so he could tell the boys when they were ready for college that he had a degree, but had gotten it "the hard way." The mother had been a night-club singer before her marriage. Her family had been moderately wealthy and had given her everything she wanted as a child "except love." The father's parents had been divorced; his mother had had three husbands but finally came to depend upon her son for support. She was described as an extremely emotional and hypochondriacal woman who was constantly bothering the father for attention or money. The father was said to favor the older boy, who was brought up on a rather strict routine and with whom they had little or no trouble.

After a provisional diagnosis of breath-holding spells, the patient and his mother were seen in seven sessions over a 10-week period. In the second interview the mother stated that she felt the whole situation was due to the fact that they expected the patient to follow a strict routine without trouble, as his brother had done, but that he was different, needed more attention, and this was his way of getting it. After three talks at weekly intervals with the mother and a few play sessions with the boy, the spells diminished in number and intensity. The mother reported that he had several abortive attacks without cyanosis or unconsciousness; then they stopped altogether. At the same time he began to tell his mother when he needed to have a bowel movement, and established a regular habit in this regard.

Emphasis during the sessions was placed on letting the mother talk out the troubles she had been having with her inlaws and in subtly suggesting she be gentler and more consistent in her handling of the boy. The case was closed by the mother after the seventh interview. There had been no recurrence from the fourth week up to that time.

CASE 2.—White girl, aged 2 years 3 months. The presenting complaint was breath-holding spells with a question of epileptic attacks. The onset occurred at the age of 10½ months with crying because she was not picked up. The child was the second of two children of well-educated parents. The pregnancy was not planned. The mother had "back trouble" after the first child, was nursing it, and thought she could not become pregnant while doing so. The mother had an electroencephalogram which

was said to be abnormal, but she was asymptomatic. There was no family history of convulsions. The child had an apparently normal developmental history. She was played with rarely until 7 months of age because she "just ate and slept, and was very good." She started walking at about 10 months, and the first seizure occurred at 10½ months, when she was not picked up while crying. There were seven more episodes during the next two weeks, all with crying from frustration or anger. There was a diagnosis at one year of early epilepsy, supposedly from the electroencephalographic changes. Phenobarbital, methylphenylethyl hydantoin (Mesantoin), and several other anticonvulsant drugs were started at 13 months. At 15 months she was placed in a hospital for two weeks without medication, and the mother did not visit during this time. There were no spells while she was in the hospital, but the child was pale, quiet, and lost weight. She was then placed in a foster home for seven weeks, and the spells increased in frequency and severity. The patient was very afraid of stairs and of the "potty chair," and was not bowel- or bladder-trained. The father was stern with the child but affectionate. He did not take the child out because both he and the mother were afraid she would have a spell and people would talk. Even the maternal grandparents did not know about this, although the paternal grandparents did. She was hospitalized at 2 years 3 months, at which time we first saw her. The electroencephalograms were repeated and were normal. There were no spells in the hospital.

The parents were advised to avoid the frustrations and conflicts, not to be strict with the habit training, and to offer the affection that had been missing in the child's environment so far. All medication was discontinued. There were a few spells after the child returned home, but they gradually became less in number and severity and within a few months disappeared altogether.

CASE 3.—White girl, aged 14 months. The onset of attacks was at 7 months, after a fall from bed. After this the spells occurred rather frequently but irregularly, following fright, pain, or anger. There was not much crying with the spells, but just breath-holding, cyanosis, and unconsciousness. The infant was bottle-fed, and development was normal, with no illnesses or injuries. There was moderately strict discipline in the home, but also many inconsistencies. The mother was a registered nurse, aged 25 years. Her father had a "fearful temper." One maternal uncle had breath-holding spells as an infant. The father of the patient, aged 27 years, was a shipyard worker. He was quiet and "easy going." His mother was very "quick tempered." The physical examination was essentially negative. No electroencephalogram was done. The impression was breath-holding spells as an attention-gaining device. Only one interview was had. The meaning of the spells and their organic harmlessness was discussed with the mother, and she was encouraged to stress kindness and consistency in dealing with the child. The patient continued to have a few spells after the original interview. A letter from the referring physician, six months after she was seen in our clinic, stated that the child had had some "attacks that were typical of grand mal," and these were controlled with phenobarbital.

CASE 4.—White girl, aged 5 years 7 months. The spells had occurred with variable frequency for two to three years, some accompanied only by cyanosis and others ending in unconsciousness. They occurred with fright, hurt, or anger. Past history revealed a normal pregnancy and delivery, somewhat delayed development, with walking at 17 months and talking at 2 years. The child was said to have stammered badly at age 4 and still did so when upset. Physical examination was entirely negative. Family history revealed a mother who was 37 and who described herself as "materialistic, impatient with disobedience, an extrovert, and a violent, quick temper." She speaks of her own childhood as being unhappy, was prone to blame her present feelings on this, and was very attached to her father. The child's father was 39 and described by the mother as calm, deliberate, patient, an introvert, and seldom lost his temper. She felt that he was too easy with the children and occasionally insisted that he punish them. The mother felt that her own marital adjustment was difficult from the beginning, partly because of her attachment to her father and partly because of inexperience. The adjustment was said to be good at that time. The two children were planned and wanted, but the mother said she would be upset if she became pregnant again. The patient's younger brother was described as unemotional, deceitful, and self-willed. The mother felt he had little sense of guilt. The mother also stated that she did not enjoy activities with her children and became irritated when they required attention. The child, when seen, was chubby, well-behaved, friendly, and talkative. Her intelligence quotient was 100. No specific material was elicited. The mother was reassured, and it was suggested that the children were reacting to overly strict, unsympathetic, erratic, and impulsive discipline. She was encouraged to spend more time with her children, to cultivate an interest in their activities, and to give them more independence. Two weeks later the mother felt things were better but said she was having great difficulty in controlling her temper. In the third interview two weeks later the mother brought out some more material concerning the father's background. His parents were divorced and he had divided his time between them. He was in

military school from an early age and "came out with a tremendous inferiority complex." She described him further as moody, unsocial, virtually without friends, having little ability conversationally and no avocational interests. She felt that much nagging on her part brought him out of this and her friends had told her that "she has made him." In the fourth interview, following another two-week interval, the mother had better insight and had begun to realize she had expected too much of her children. In a telephone report four months later the mother said the children were doing just fine and there had been no recurrence of the breath-holding spells.

CASE 5.—White girl, aged 2 years 6 months. The onset of the spells occurred at the age of 18 months. She had fallen backwards off a step, cried and held her breath, turned blue, became stiff, and fainted. The whole episode lasted about two minutes. The child had had eight attacks in the previous year; all but one of these had followed a fall. The one exception had occurred at 7 a. m., and the parents were unable to arouse the child until about 9:30 a. m. There had been no sedatives given; there had been no illness and no obvious explanation to account for this variation. The mother stated that nearly all of the spells had occurred when someone had been visiting in the home and had left, and the child had fallen thereafter. The family history is negative. There was a one-year-old brother (this might be of significance in that the onset of the spells was at the time of the younger sibling's birth). Past history was noncontributory. Physical and neurological examinations were normal. Developmental quotient was normal. The diagnosis of breath-holding spells was made, and the mother was given reassurance and advice about handling and told to return if the trouble continued. There was no further follow-up in this case.

CASE 6.—White boy, aged 14 months. This child was in the hospital with a nutritional anemia at the time of the first interview. Past history was negative with the exception of marked problems in the realm of feeding. The family history was of interest in that the mother seemed emotionally unstable and immature. She was completely dependent upon the father and had many seemingly unreasonable fears (thunder, dark, being alone). The father was said to be stable and level-headed. The patient had no siblings. The physical examination was negative except for a nutritional anemia of moderate degree. The child was fussy and fearful but adjusted within a few days and began to take solids well. The present illness reveals that the child had had four breath-holding spells "within the past few months," all in response to fright, all resulting in unconsciousness. The parents were counselled in regard to feeding, consistency in discipline, and general child management. A follow-up on this child after several weeks revealed no further spells but no real change in the mother's attitude. There was no further follow-up.

CASE 7.—White boy, aged 2 years. The onset of spells was at 12-14 months and occurred as frequently as four to five times a day but with intervals of weeks without any spells. The parents felt that all the spells were initiated by a fall, as had been the first, until recently, when anger and frustration seemed to play a role. The child had had three spells of generalized twitching and one in which there was twitching and frothing. The family was not sure that breath-holding was implicated in these spells. Family history revealed that the mother had cardiac arrythmias, giddiness, and palpitations. The father had had breath-holding spells in infancy. The patient's twin brother had breath-holding spells, but his were not as frequent as the patient's and did not end in unconsciousness. There were two cousins on the maternal side who had breath-holding spells. One maternal aunt was mentally defective and epileptic.

Physical examination and neurological examinations were normal. Electroencephalogram showed a basic rhythm irregular at 7 per second, with frequent sporadic and sequential waves as slow as 5 per second and more frequent on the left side. This record was interpreted as normal for the child's age. The slow activity on the left was said to be "puzzling but probably not significant."

The patient was given diphenylhydantoin (Dilantin) and phenobarbital. There was no difference in frequency or severity of the spells whether on or off medication. A follow-up on the patient at the age of 3 years revealed that there was great unrest in the family and that the father was drinking heavily and abusing the mother and children. Divorce was imminent and actual separation had taken place. The patient's breath-holding spells had become more frequent. The last follow-up on this patient was at the age of 4 years, when he was said to be having a few spells still but much less frequently and less severe.

CASE 8.—White girl, aged one year. Onset of the breath-holding spells was at 3-4 months, and the frequency of the spells was between 2-3 and 10-15 daily following injury, displeasure, fright, or anger. The spells always ended in unconsciousness. The three spells preceding the intake interview had ended in generalized convulsive seizures. Past history revealed a premature, instrumental delivery because of placenta praevia. The child was kept in an incubator for some time. Developmental history was normal. Past illnesses revealed only an allergy to eggs. Family history revealed allergies in both parents and eczema and hay fever in the maternal grandmother. The mother and maternal grand-

father had recurrent headaches and arthritis. The patient's 4-year-old brother had mild breath-holding spells to the age of 3 years. In the hospital the patient had one spell right after another whenever anyone approached her bed. The child's pulse was slow during the attack, and the emptying time of the stomach was delayed. The question of vagotonia was raised but could not be proved. The parents were given reassurance and advice and were offered child-guidance care but did not return for follow-up.

CASE 9.—White boy, aged 18 months. The onset of the spells was at the age of one year, the frequency averaging one to two spells per week but occurring as often as two to three times a day or having a two- to three-week period without spells. They occurred only when the child had been hurt, frightened, or upset. The child had been studied at another institution, and the electroencephalogram had been reported as abnormal. However, this record could not be obtained. An attempt at air encephalography had been unsuccessful. The parents reported at the time of intake that the child's last attack had ended in a severe tonic and clonic convulsion and artificial respiration had been given. The patient's parents thought the child was dead at this time. Family history was noncontributory. Past history reveals a normal pregnancy, a forceps delivery, and normal condition at birth. The parents felt he was a happy baby during the first few months of life. Some feeding problems developed when solid foods were introduced, and these had continued. Developmental history was normal. Toilet training was started at 9 months, with a great deal of resistance and friction surrounding it, and the child still objects to the toilet. Physical examination was within normal limits except for a marked microcytic anemia. The parents were reassured, and the child was started on iron therapy. A follow-up after a two-week interval revealed that there had been one more spell occurring after a fall, but no convulsion occurred. The child was eating well and in general was much more manageable, and the mother appeared to have good insight into the nature of the problem and said she felt greatly reassured. There was no further follow-up.

CASE 10.—White girl, aged 19 months. The child was adopted at age 2½ months. Family history was said to be noncontributory by the adoptive parents. Past history had been uneventful except for severe bronchitis at age 11½ months which was followed by recurrent bronchitic episodes for the next three or four months. Developmental history was normal.

The first breath-holding spell occurred at age 8 months, following an injury. The second spell was 12 hours later, following an injury. Since that time the child had had a spell a day. The spells usually followed pain or fright but had followed frustration and anger. One month prior to the intake interview she had had a spell followed by a clonic convulsion, lasting for two to three minutes. The physical examination was entirely normal. The electroencephalogram was reported to show irregular 1-2-per-second slow waves in the right occipital region. The record was otherwise normal. The irregularities were felt to be possible artefacts, and a repeat electroencephalogram was advised after a three- to six-month interval. The diagnosis of breath-holding spells was made. The parents were advised concerning the handling of the child and were told to return in six months. At the time of the return visit the electroencephalogram was reported as normal, and the mother stated that the child was having fewer and less severe spells. There had been no further convulsions. The mother had gained a considerable amount of insight into the psychogenicity of the symptom and was handling the situation capably. There has been no further follow-up in this case.

CASE 11.—White boy, aged 2 years. Onset of the breath-holding spells was at 10-11 months, with associated temper tantrums. The spells occurred as frequently as four to five times a day, occurred every time the child was frustrated, hurt, or angry. There had been convulsive movements following the spells on five occasions. Past history was noncontributory; development was normal. There had been no significant illnesses, and the family history was noncontributory. Physical examination was normal except for a mild anemia. The electroencephalogram was reported as possibly a little immature but otherwise within normal limits. The diagnosis of breath-holding spells was made.

The parents were seen with the child at weekly intervals and reported only two spells during the first two weeks of treatment, none during the third week, and in the fourth week of treatment the child attempted to hold his breath after correction by his mother but was unable to become unconscious. The parents had gained a great deal of insight and had planned together for a consistent and well-organized program of modified permissiveness in handling their child. There were no further episodes of breath-holding in this case.

SUMMARY OF CASES

The review of the literature was stimulated by the study of 11 cases of breath-holding going on to unconsciousness which were seen in the Children's Service of the Stanford University Hospitals. Of the 11 children, 5 were boys and 6 were girls. The age at which the children were seen ranged from 1 year to 5 years 7 months. There was only one, however, over 2½, and the average age,

excluding the oldest, was approximately 1 year 9 months.

The age of onset of the spells ranged from 3 months to 24 months, the average being a little over 10 months. The frequency of the spells varied greatly. One 2½-year-old girl was said to have had eight spells in a year. A one-year-old girl was said to have as many as 10 to 15 spells a day at times. Two children had four or five a day, one had one a day, one had from one or two a week to two or three a day, one had one or two a week, another had four in a few months, and three were said to have them frequently.

In four cases the first spell occurred following a fall or injury. One occurred when the child was not picked up. In another case the spells began after the birth of a sibling. In all the cases, the spells were precipitated by fright, pain, or anger. In 8 of the 11 cases, the spells, on occasion, went on to convulsive seizures. In none of the 11 children were there any physical findings of significance, except 3 who had some degree of nutritional anemia (two "marked" and one "mild"). One case had been diagnosed as epilepsy before first seen in the Pediatric Clinic, and one was said to have become epileptic later (letter from family doctor).

In several cases, strained interpersonal relationships within the family were obvious. In four cases there were conflicts with the child in regard to feeding, and in three cases in regard to toilet training. In one case toilet training was started at 9 months and in another at 10 months; in both of these cases, the child was resisting the procedure vigorously. In three families there was frustration in regard to relatives living in the family, and in two there was marital friction, divorce being considered in one. In at least two the parents seemed to be overly demanding and strict. There was a family history of breath-holding spells in four. One child's twin had them, but not to the point of unconsciousness.

In six of the children the spells ceased in a few months. One was noted to be much better two years later. One was said to have become epileptic, and there were no follow-up reports in three.

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News and Comment

ANNOUNCEMENTS

Fellowships in Pediatric Cardiology.—One or two fellowships in pediatric cardiology will be available beginning July, 1956, at The Children's Orthopedic Hospital, Seattle. Training will be in conjunction with the Department of Pediatric Cardiology, University of Washington School of Medicine. Salary open. Desire applicants with minimum of two years of pediatrics. Direct correspondence to Robert A. Tidwell, M.D., The Children's Orthopedic Hospital, 4800 Sand Point Way, Seattle 5.

Case Reports

MYOCARDIAL INFARCTION DUE TO CALCIFICATION OF THE ARTERIES IN AN INFANT

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and
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CALCIFICATION of the arteries in infancy and childhood is not an uncommon entity. Approximately 50 cases have been reported. This condition differs from adult arteriosclerosis in that the primary arterial change is calcium deposition on the internal elastic lamina. In arterial diseases of adults calcification is a secondary finding and occurs in the media and atheromatous calcification follows the intimal changes.

We are reporting a case of arterial calcification with myocardial infarction in an 8-week-old infant.

REPORT OF A CASE

J. W., an 8-week-old girl, was admitted to the hospital on Sept. 22, 1954. This infant had been ill approximately 40 hours with "vomiting and a cough." She was seen by the family physician, who prescribed oral oxytetracycline drops and administered penicillin intramuscularly. Because of the patient's failure to respond to therapy, an x-ray film of the chest was taken on Sept. 22, 1954, at another hospital, which showed "congestion of the lungs." The infant was then referred to us for care at the Children's Memorial Hospital.

Prenatal, birth, family, and feeding histories were noncontributory except for a male sibling who had died at 7 years of age at this hospital in 1946. Upon reviewing his record it was found that he died of "status epilepticus." Postmortem findings were unremarkable. However, an interesting and not unusual finding was calcification of the arteries of the thymus gland.

There was no history of allergy, tuberculosis, diabetes, venereal disease, or malignant disease in the family. This infant had received no drugs, had ingested no poisons, and was taking one-third the daily requirement of standard multivitamin preparation.

Physical examination revealed a cyanotic pale semicomatose dehydrated white girl. She weighed 5000 gm. and measured 56 cm. The anterior fontanelle was sunken. The eyes were staring, and the pupils reacted poorly to light. Examination of the ears, nose, and throat was normal except for some dryness of the mucous membranes. The neck was supple. Respirations were 46 per minute—shallow, labored, and irregular. There were subcostal and substernal retractions. Percussion of the lung fields was normal. Upon auscultation of the lungs rough breath sounds and fine rales were heard. The heart was normal in size. No thrill was felt. There were no murmurs audible. The rate was 148 per minute. Blood pressure was not recorded. Femoral pulsations were present. The liver extended 3 fingerbreadths below the right costal margin. The spleen was not palpated. Genital and rectal examinations were normal. The skin was cool and clammy. Deep tendon reflexes could not be elicited. There were no petechiae, nor was there edema of the extremities.

Because of the patient's critical condition she was immediately placed in an Isolette with oxygen and vapor. Blood, 5% dextrose in water, and oxytetracycline were administered intravenously. Procaine penicillin was given intramuscularly.

Her condition grew progressively worse, and more rales and rhonchi were heard upon auscultation of the chest. She was digitalized, and levoephedrine was added to the intravenous infusion. However, the infant died five and one-half hours after admission to this hospital.

Laboratory Data. — Blood chemistry studies showed the following results: NPN, 40 mg. per 100 cc.; sodium, 139.3 mEq.; potassium, 5.5 mEq.; CO_2, 22.4 mEq.; chlorides, 92 mEq.; pH, 7.51; glucose, 131 mg. per 100 cc.; calcium, 10.8 mg. per 100 cc.

Nose and throat cultures grew hemolytic Staphylococcus aureus and Pseudomonas.

Complete blood cell count, electrocardiogram, and urinalysis had not been performed.

The chest x-ray was reported as showing slight cardiac enlargement and diffuse parenchymal infiltration of the lungs compatible with pulmonary edema. The liver was also seen to be enlarged.

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From The Children's Memorial Hospital, and Otho S. A. Sprague Memorial Institute Laboratory.

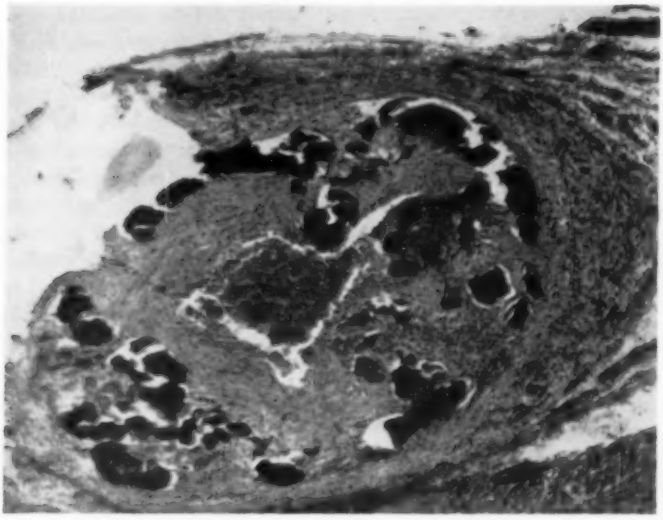


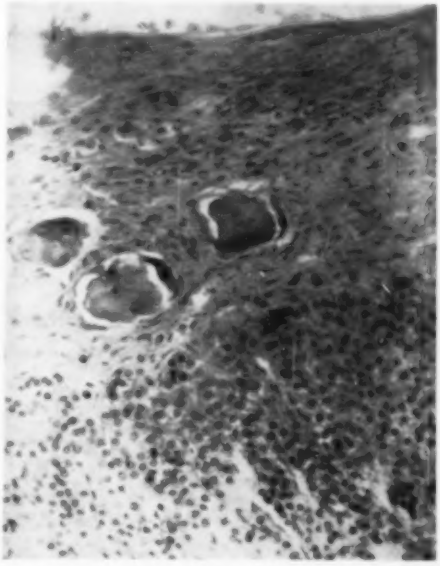
Fig. 1.—Coronary artery (see text).

Postmortem Findings.—Grossly the lungs and liver were slightly congested. The heart measured 5 cm. in length and 3.5 cm. in width. It weighed 30 gm. The anterior descending coronary artery was in a normal position. The atrioventricular groove was 0.3 cm. in depth. The atria were of approximately equal size. The left ventricle was also approximately equal in size to the right ventricle. The right atrium measured 2×2 cm. Its walls were 0.1 cm. thick, with a thin endocardium. The crista terminalis, right auricular appendage, and pectinate muscles were not remarkable. The coronary sinus measured 0.1 cm. in diameter and had a well-formed Thebesian valve. The foramen ovale was closed. The right ventricle was 4 cm. in length. Its walls were 0.4 cm. thick, with a thin endocardium and normal muscular configuration. A small petechia was present in the midanterior portion of the right ventricle. The muscle was pale brownish-red. It was soft and flabby. The left atrium was the same size as the right atrium. The left auricular appendage was normal. The wall of the left atrium was 0.2 cm. thick, with a thin endocardium. The left ventricle was 4 cm. in length. There was no endocardial thickening or abnormal muscular configuration. The myocardium was pale reddish-brown and somewhat soft. The wall measured 0.8 cm. thick. The interventricular septum was intact.

The remaining viscera were normal.

Microscopic examination of the heart revealed that the lumen of the right coronary artery was markedly narrowed by numerous calcium deposits separated by fibrous septa (Fig. 1). With elastic tissue stains it was demonstrated that these deposits were on both sides of the internal elastic membrane. In a few areas of the myocardium there was necrosis of the cardiac muscle, with a dense infiltration of polymorphonuclear leucocytes, eosinophiles, and large giant cells. Cross section of the vessels in the periaortic tissue showed calcium deposits within the wall of small arteries with characteristics identical with those of the coronary artery. The left coronary artery was normal both grossly and microscopically.

Fig. 2.—Calcium deposits in vessel of adrenal medulla.



Similar deposits of calcium were present in the vessels of the otherwise normal thyroid gland and adrenal medulla (Fig. 2).

Microscopic examination of the remaining viscera showed no abnormalities.

COMMENT

Cochrane and Bowden [1] reviewed the literature and described eight cases of arterial calcification, six being in infants. Four of the six infants were girls, and they varied in age from 4 days to 7 months. The clinical picture of these patients was similar to that of our infant. Onset of dyspnea with poor color was sudden. The course of the illness was short, never more than five days, and all died of congestive heart failure within one and one-half days of admission. This condition was not diagnosed before death.

These authors presented an excellent discussion of the etiology of this condition, which is unknown. They mention the marked difference between infantile arterial calcification and adult arterial calcification. The only adult arterial condition resembling infantile arterial disease is one in which the pericapsular arteries of the thyroid gland are affected. This is a nondisabling condition in young adults and is usually an incidental finding.

They list "an inborn error of calcium metabolism or a congenital abnormality of elastic tissue" as possible etiologic factors. However, the difficulty of adequate study during such a critical, fulminating disease process is obvious.

The difficulty in clinical diagnosis of this disease is mentioned, and listed in the differential diagnosis is "fulminating neonatal infections, adrenal insufficiency, renal failure, and various congenital cardiac abnormalities."

Martelle [2] reported a case of coronary thrombosis in a 5-month-old infant as a cause of sudden death. This resulted from acute myocarditis, endocarditis, and coronary arteritis (without calcification). Rheumatic fever was possibly the etiologic factor, though no Aschoff bodies were found. Its rarity is mentioned. He also reviewed the literature.

Stryker [3] superbly summarized 20 cases of coronary calcification in infancy and found that all had a similar calcification in other arteries and that the majority of patients had some form of kidney disease. He lists medial calcification with fibroblastic proliferation of the intima, polyarteritis nodosa, arteriosclerosis, syphilitic arteritis, embolism, congenital abnormalities, rheumatic arteritis, and hypertension, in that order, as causing coronary occlusion. Gruenwald [4] reported 21 cases of calcium deposits in the media of the coronary arteries in newborn infants. All of the infants had clinical signs of asphyxiation.

Baggenstoss and Keith [5] reported a case of calcification of the coronary artery in an 8-week-old girl whose clinical symptoms and findings were identical with those of our patient. Microscopic study of their case revealed the following pathology: calcium deposits in the media of the coronary arteries, with proliferation of fibroblasts, which resulted in intimal thickening with narrowing of the lumen. Secondary to this there were focal areas of necrosis in the myocardium. Similar arterial lesions were present in the kidney and periadrenal tissue. There were also edema of the lungs and fatty changes in the liver.

Brown and Richter [6] described an entity in newborns and infants which they named medial coronary sclerosis. He agrees with Stryker in stating that the region of the internal elastic membrane is calcified. This calcification may be on both sides of the membrane but usually affects the internal aspect.

In our case there was a pathological calcification of the arteries.

In review, pathological calcification is divided into two types, dystrophic and metastatic. Dystrophic calcification is that form in which calcium is deposited in the tissues and cells which are the seat of the disease. Metastatic calcification differs in that there is no tissue injury as a precursor and that calcium is mobilized from its natural place of deposit (bone).

Dystrophic calcification may occur as a result of incomplete development of the so-

called ground substance of the arteries. It has been found that this mucoid or interstitial substance has a special affinity for lipids and calcium because of its high content of chondroitin-sulfuric acid and is most abundant in the inner sheaths of the media in arteries of the elastic type.

Potter [7] suggests that the etiology of the primary injury is an embryonal defect of elastic tissue that makes the vessels unusually susceptible to any noxious agent.

The possible causal factors of metastatic calcification are hypervitaminosis D, hyperparathyroidism, destructive lesions of bones, allergy, infection, and renal lesions. In all of these there is an alteration in the blood so that calcium cannot be maintained in solution. In our particular case all the causes of metastatic calcification are apparently eliminated by the history and physical examination. Therefore, this case may be categorized as one of dystrophic calcification.

SUMMARY AND CONCLUSIONS

Myocardial infarction in an 8-week-old infant due to calcification of the coronary arteries is reported. Also present was calcification of the arteries of the adrenal and thyroid glands.

The literature is reviewed, and the pathogenesis of this condition is discussed.

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SICKLE-CELL-HEMOGLOBIN-C DISEASE

Report of a Case with Electrophoretic Studies of Hemoglobin in Family Members

LT. NORMAN B. SCHELL (MC), U.S.N.R.
and
LT. COMDR. JOSEPH M. McGINLEY (MC), U.S.N.R.

THE ENTITY of sickle-cell-hemoglobin-C disease is not a rarity. After Pauling and co-workers [1] had first demonstrated a unique electrophoretic pattern for sickle-cell hemoglobin, Itano and Neel [2] used this technique in 1950 to ascertain a new inherited abnormality of hemoglobin. This was initially designated hemoglobin III [3] and subsequently was renamed hemoglobin C.[4]

Since that time, 71 cases of the syndrome of sickle-cell-C-hemoglobin disease have been described in the English language literature.* Undoubtedly many more cases of this combination have been overlooked, for the incidence of hemoglobin C has been estimated to be between 0.3% and 3% of the American Negro population.†

It is important for the pediatrician to remain aware of this disease, for it mimics sickle-cell anemia but differs in prognosis and management. The following case report illustrates the resemblance to classical sickle-cell anemia and the necessity for performing electrophoretic hemoglobin studies to distinguish the two. Fortunately, filter-paper electrophoresis affords a simple and economical method.‡ Electrophoretic studies of this patient identified the presence of the two types of hemoglobin in the erythrocytes—hemoglobin S (sickle-cell trait) and hemoglobin C (trait). All the available members of her family were then studied by the same technique to determine the genetic transmission of the S and C traits.

REPORT OF CASE

P. P., a 7-year-old Negro girl, entered St. Albans United States Naval Hospital on March 22, 1955, with a three-day history of low-back, knee, and shoulder pains.

Past history was essentially negative except for intermittent epistaxes and occasional epigastric pains during the previous year. Three days prior to admission she fell off her bicycle and shortly thereafter developed severe pains in the back of both thighs. The following day, she complained of severe discomfort in the lumbosacral area. On the day prior to admission she experienced marked pain in the left shoulder, which was aggravated by motion at the joint. In addition, she had some abdominal cramps for about two hours that day. There was no history of recent infection in the upper respiratory tract or elsewhere, but the temperature was elevated to 100.6 F on the day before admission.

Family History.—This was entirely negative for blood dyscrasia except that the mother had "slightly

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From the Pediatric Service of U. S. Naval Hospital, St. Albans, N. Y.

The opinions and assertions contained herein are the private ones of the writers, and are not to be construed as official or reflecting the view of the Navy Department or the Naval Service at large.

* References 3-15, 20, 21, and 23. Since the preparation of this manuscript, two additional cases of sickle-cell-hemoglobin-C disease have been reported in the American literature (Scott R. B., and Jenkins, M. E.: Studies in Sickle-Cell Anemia: V. Sickle-Cell Hemoglobin C Disease, *A. M. A. Am. J. Dis. Child* **90**:35, 1955).

† References 7, 10, and 16.

‡ References 7, 11, and 17.

TABLE 1.—*Complete Hematologic Data on Patient*

Blood type: B-Rh positive	
Hemoglobin electrophoresis: hemoglobin S (sickle cell) 45.3%; hemoglobin C 54.7%	
Red blood cell count: 2,650,000	Reticulocytes: 0%
Hemoglobin: 8 gm. (56%)	Platelets: 116,000
Color index: 1.13	Sed. Rate: 6 mm/hr. (Wintrobe)
White blood cell count: 15,500	
Immature cells: 2%	Hematocrit: 25 vol. %
Polymorphonuclear cells: 66%	Mean Corp. Vol: 96 cu.μ
Lymphocytes: 31%	Mean Corp. Hb.: 30.2 $\mu\gamma$
Monocytes: 1%	M.C.H. Conc.: 32 gm. per 100 cc.
Smear: anisocytosis, poikilocytosis, normochromia	
Target cells: 3%	
Sickle cells: 10% in 2 hr.; 80%-90% in 18 hr.	
Red cell osmotic fragility:	
Hemolysis begins (patient) 0.32% NaCl—incomplete at 0.20%	
Hemolysis begins (control) 0.40% NaCl—complete at 0.28%	
Bone marrow: Erythroid hyperplasia and myelocyte-erythrocyte ratio 1:1	

low blood count" during her pregnancies. No familial incidence of epistaxes, joint pains, or rheumatic fever was reported.

Physical Examination.—Examination revealed a thin well-developed Negro girl who appeared uncomfortable but not in acute distress. Her temperature was 101.2 F rectally. Pertinent findings were limited to the abdomen and left shoulder. The spleen was enlarged to 2 cm. below the left costal margin and was soft and nontender. The liver was not palpable, and no abdominal tenderness existed. The left shoulder joint was tender to touch and motion, but no sign of inflammation was present. All other joints were painless. No icterus was observed.

Laboratory Data.—Initially, white blood cell count was 15,500 and the hemoglobin was 8 gm. per 100 cc. (56%) (Haden-Hauser). The wet sickle-cell smear became slightly positive in 2 hours, and 80%-90% of the erythrocytes were sickled in 18 hours. See Table 1 for complete hematologic data.

Urinalyses were completely negative, including three specimens for bile and urobilinogen. Serum

Fig. 1.—Paper electrophoretic patterns of hemoglobin of family members with quantitative determinations of hemoglobin types in each. P. P. is patient in study. Note that hemoglobin C has slowest mobility toward anode (head of arrow); hemoglobin A has fastest mobility, and hemoglobin S has intermediate mobility. Density of images varies directly with the hemoglobin concentration of each type.

PAPER ELECTROPHORESIS

	% HGB A	S	C	SICKLE PREPARATION
MRS. P.	71.5	28.5	0	+
MR. P.	74.2	0	23.8	0
P. P.	0	45.3	54.7	+
J. P.	66.4	0	33.6	0
T. P.	100	0	0	0
G. P.	100	0	0	0

bilirubin was 0.56 mg. per 100 cc., with indirect 0.44 mg. and direct 0.12 mg. BUN was 13.4 mg. per 100 cc. ECG was normal, and skull and long-bone roentgenograms showed no abnormalities. Bone marrow examination revealed erythroid hyperplasia, with increased numbers of normoblasts and pronormoblasts; some sickled red blood cells were noted; and the myelocyte-erythrocyte rato was 1:1.

Filter-paper electrophoretic studies of the hemoglobin were performed, and the presence of both S and C hemoglobins was demonstrated (Fig. 1).

Course.—The child was kept at bed rest and treated with forced fluids and penicillin. In 24 hours she was afebrile and comfortable. She complained occasionally of left shoulder pain, but this completely subsided by the second day. She was continuously thirsty and voided frequently. On March 25, 1955, three days after admission, she was discharged without any sign of icterus. Her spleen was still palpable 2 cm. below the left costal margin; the hemoglobin was 8.5 gm. per 100 cc. and the white cell count, 7050.

The case was diagnosed as sickle-cell anemia in mild crisis until the electrophoretic studies revealed sickle-cell-hemoglobin-C disease. The entire available family was then investigated for the presence of S and C hemoglobins. This included brother G. P., 11; sister J. P., 9; sister T. G. P., 6; mother T. P., 30; father H. P., 36; maternal grandmother D. P., 50; and maternal first cousin (female) E. P., 16. See Table 2 and Figure 1 for data.

TABLE 2.—*Hematologic Data on Family of Patient*

Name	Age, Yr.	Hemoglobin		Sickle Cells*	Hemoglobin Types, %			Target Cells,	Symptoms
		Gm.	%		A	C	S	%	
P. P.†	7	8	66	+	0	54.7	45.3	3	Arthritis
J. P.	9	10	69	0	66.4	33.6	0	0	None
G. P.	6	14	97	0	100	0	0	0	None
T. G. P.	11	12	83	0	100	0	0	0	None
Mrs. P.	30	11	76	+	71.5	0	28.5	0	None
Mr. P.	36	14.5	94	0	74.2	23.8	0	0	None
E. P.	16	12.5	86	0	100	0	0	0	None
D. P.	50	11	76	0	100	0	0	0	None

* Sodium metabisulfite method.
† Patient reported.

COMMENT

Although sickle-cell-hemoglobin-C disease can be definitely diagnosed only by electrophoretic hemoglobin studies, the syndrome presents distinct clinical, hematologic, and genetic features.

Clinical Aspects.—The combination of S and C traits may produce diverse symptoms which closely resemble classical sickle-cell disease. The present patient exhibited a migratory polyarthralgia, abdominal pain, low-grade fever, anemia, and splenomegaly. The clinical course was milder than that of true sickle-cell disease, and there was no icterus. The serum bilirubin was not elevated, and roentgenograms of the skull and long bones revealed no changes characteristic of a chronic hemolytic syndrome.

The S-C (sickle-cell-hemoglobin-C) cases described in the literature have all occurred in the Negro race between the ages of 4 and 43, with no sex preference. The commonest complaints were episodes of bone and joint pains. Next in frequency were bouts of abdominal cramps — including five cases of splenic infarction following air flight.§ Painless gross hematuria was observed in seven cases.‖ Additional symptoms have included subarachnoid hemorrhage,[13] pleuritic pain,[14] profound jaundice and anemia during pregnancy,¶ and generalized convulsions.[7]

It is interesting that, in the course of electrophoretic studies, Morgan, Bowles, and Harris [14] found two persons with sickle cells and hemoglobin C without anemia or symptoms.

Physical signs are usually minimal, but splenomegaly is almost constant. In contradistinction to sickle-cell disease, the splenic enlargement in this disease progresses throughout childhood and adulthood and increases during hemolytic periods. Hepa-

§ References 15 and 18.
‖ References 7, 8, and 12.
¶ References 7 and 14.

tomegaly is frequent, but cardiac murmurs and enlargement are usually absent. Involved joints are often tender, although other signs of inflammation are uncommon. Frequently, the serum bilirubin is slightly elevated, but jaundice is rare. Unlike the bone changes anticipated in Mediterranean and sickle-cell anemias, the bone x-rays of sickle-cell-hemoglobin-C patients are characteristically normal. However, Smith and Conley [15] reported seven instances of aseptic necrosis of the femoral or humeral heads, and Ranney and his co-workers [8] described two cases with bone changes.

Despite the recurrent episodes of mild hemolytic crises, this condition apparently does not interefere with normal activity, growth, and development. All authors have intimated a normal life expectancy.

The benign nature of the disease precludes a detailed discussion of treatment. The hemoglobin rarely falls below 8 gm. (56%), and the crises are short and self-limited as a rule. Women with sickle-cell-hemoglobin-C syndrome should be carefully followed during pregnancy for the development of severe hemolytic anemia requiring transfusions. In addition, patients with marked hematuria may need blood replacement. The studies of Kaplan, Zuelzer, and Neel [9] suggest normal survival of erythrocytes transfused from normal donors.

Ranney, Larson, and McCormack [8] reported one case of sickle-cell-hemoglobin-C hemoglobinopathy in which splenectomy did not improve the mild anemia. Doerges and co-workers [16] and Smith and Conley [15] described five cases of splenic infarction after aerial flight in which splenectomy was the treatment of choice. Chapman and his group [12] believe that some sickle-cell-hemoglobin-C patients may require nephrectomy for severe hemorrhage and/or infection of kidneys.

Hematologic Aspects.—The outstanding finding in the sickle-cell-hemoglobin-C blood picture is the presence of a large number of target cells in the peripheral smear. Our case in study showed only 3% target cells, whereas Kaplan, Zuelzer, and Neel [6] found a range of 40% to 84% of the total erythrocytes in their series of cases. Although there was some overlapping, they demonstrated the preponderance of target cells in sickle-cell-hemoglobin-C disease over those in sickle cell anemia.

The sickling trait may require a reducing agent such as metabisulfite for expression, but it was quickly evident here after the specimen stood for a few hours in a wet smear. There is usually a mild normochromic anemia with the corpuscular constants in the normal range (Table 1). Reticulocyte counts are normal or slightly elevated, and the red cells have increased resistance to hypotonic hemolysis on fragility testing. Bone marrow studies indicate moderate erythroid hyperplasia, which is probably compensatory. Kaplan and his associates [9] demonstrated a moderate increase in fecal urobilinogen excretion.

Employing radioactive chromium (Cr^{51}) to tag the erythrocytes of a man with sickle-cell-hemoglobin-C syndrome, Weinstein and co-workers [20] deduced a red cell survival-time of 20 days' half-life compared with normal half-life survival of 33.1 ± 3.2 days. Kaplan, Zuelzer, and Neel [9] proved a rapid elimination of sickle-cell-hemoglobin-C erythrocytes transfused into normal recipients, while normal red cells transfused into sickle-cell-hemoglobin-C recipients had a normal rate of elimination.

Although the presence of an abnormal number of target cells on smear may arouse suspicion of hemoglobin C, the electrophoretic mobility pattern provides the only positive identification of hemoglobin C and its various combinations.

Hemoglobin C migrates electrophoretically as a more positive ion than either hemoglobin A (normal adult) or hemoglobin S. Consequently, hemoglobin C has the slowest mobility rate of all hemoglobins tested by filter paper electrophoresis, while hemoglobin A has the fastest migration toward the anode and hemoglobin S has an intermediate rate [11] (Fig. 1). The amounts of hemoglobins

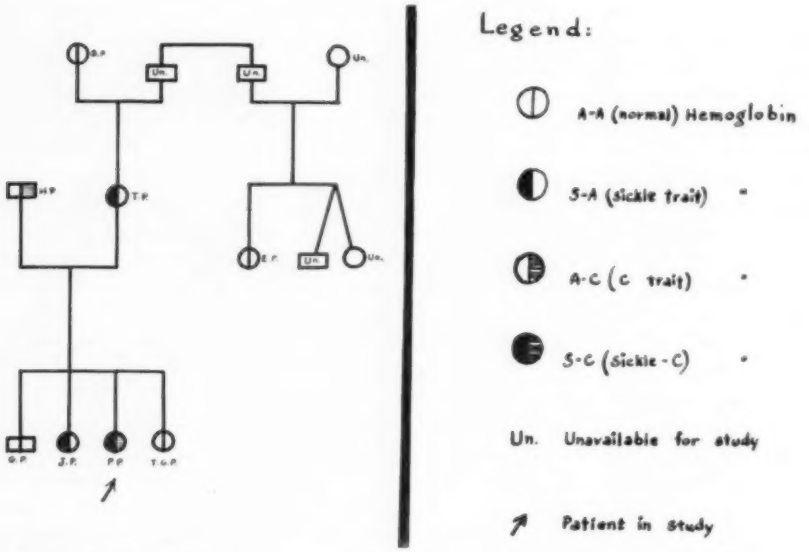

Fig. 2.—Family pedigree chart showing genetic transmission of hemoglobin-S and -C traits.

S and C are usually equally divided in the make-up of sickle-cell-hemoglobin-C persons. The range of hemoglobin C is 37% to 67%, with an average of 50%.# Our patient had 54.7% hemoglobin C and 43.3% hemoglobin S; her father had 23.8% hemoglobin C, and her mother had 28.5% hemoglobin S (Fig. 1 and Table 2). Hemoglobin F (fetal) in amounts up to 7.6% [19] may also be ascertained in sickle-cell-hemoglobin-C patients by alkali denaturation.

Genetic Aspects.—Various combinations of hemoglobins A (adult, normal), F (fetal), S (sickle), C, and D have produced at least 10 genetically distinct conditions, including the union of sickle-cell trait with thalassemia trait.[13]

In 1949, Neel [23] postulated that persons with sickle-cell trait are heterozygous in the gene for sickling and those with sickle-cell anemia are homozygous in this gene. Presumably, patients with sickle-cell disease inherit one gene for hemoglobin S from one parent and one gene for hemoglobin C from the other parent.

Figure 2 demonstrates that the S trait in our case was inherited from the mother and the C trait from the father. In addition, the father transmitted the C trait to another daughter, J. P., who has 10 gm. (69%) of hemoglobin and has been entirely asymptomatic. All other members of family had hemoglobin A.

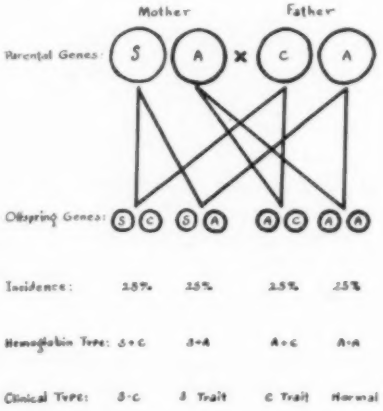

Fig. 3.—Expected Mendelian transmission of S and C genes from the union of a person with sickle trait with a person with hemoglobin-C trait.

References 10 and 11.

Kaplan, Zuelzer, and Neel * studied five families with S and C traits and concluded that the C tendency depends on a single gene transmitted as a Mendelian dominant. It would therefore be anticipated that the offspring of an S trait and C trait union would be A-C 25%, S-C 25%, S-A 25%, and A-A 25% (Fig. 3). In our family study, the children were A-C 25%, S-C 25%, and A-A 50%. This closely conforms to the Mendelian pattern.

The two genes S and C may be either independent or linked on the same chromosome or may be members of a series of multiple alleles governing sickling and normal hemoglobin. The two factors may potentiate each other or may be simply additive in effect. The exact mechanisms remain to be elucidated.

SUMMARY

A case of sickle-cell-hemoglobin-C disease in a 9-year-old girl is presented with paper electrophoretic studies of the family members.

Sickle-cell-hemoglobin-C syndrome is not a rarity and clinically may simulate classical sickle-cell disease. However, it is milder and carries a better prognosis. Sickling tendency with increased numbers of target cells, progressive splenomegaly, and minimal signs of hemolytic anemia are characteristic. Paper electrophoresis offers a practical and definitive method of diagnosis.

The clinical, hematologic, and genetic aspects of this inherited abnormality are reviewed and discussed.

Drs. Irving Schulman and Marion Erlandson, of the Department of Pediatrics, New York Hospital-Cornell Medical Center, performed all the paper electrophoretic studies on the family reported. Dr. Henry P. Goldberg, Pediatric Consultant at the St. Albans U. S. Naval Hospital, gave advice and assistance in the preparation of the paper.

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News and Comment

ANNOUNCEMENTS

Symposium on Tuberculosis and Other Pulmonary Diseases in Childhood.—Three sessions of "Symposium on Tuberculosis and Other Pulmonary Diseases in Childhood" will be offered during the remainder of the 1955-1956 academic year by the Post-Graduate Medical School of New York University-Bellevue Medical Center.

The Symposium is a full-time course of five days' duration given under the direction of Dr. Edith M. Lincoln and Dr. Margaret M. H. Smith. It includes seminars and lectures on tuberculosis, pneumonia, and chronic chest diseases in childhood. The values of bronchoscopy, roentgenography, and various surgical techniques will be discussed and demonstrated.

The January session of the course is filled. However, applications are still being received for the sessions from March 12 through 16 and June 4 through 8.

Also, Post-Graduate Medical School is offering a part-time course on "Recent Advances in Tuberculosis in Children." This will be given Thursday afternoons from Jan. 12 through March 29, under the direction of Drs. Lincoln and Smith.

The course is designed for pediatricians or general practitioners interested in the diseases of the chest in infants and children. It will include a comprehensive survey of tuberculosis in children, covered by lectures and clinics in the Out-Patient Department and patient rounds on the wards of the Children's Medical Service of Bellevue Hospital.

For further information write to Office of the Dean, Post-Graduate Medical School, 550 First Ave., New York 16.

The First International Congress of Human Genetics.—The First International Congress of Human Genetics will be held in Copenhagen, Denmark, Aug. 1-6, 1956. This congress is planned to cover all genetic aspects of normal and pathological characters in man. Any person interested in the subject of human genetics and especially of medical genetics is invited to take part in the congress.

Provisonal program and further information will be sent on request. Write to The Secretariate of the First International Congress of Human Genetics, The University Institute for Human Genetics, 14, Tagensvej, Copenhagen, N., Denmark.

NECROTIZING ARTERITIS CONFINED TO THE PULMONARY ARTERY SYSTEM

DANIEL F. DOWNING, M.D.
and
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NECROTIZING arteritis is not a rare lesion. However, few cases have been reported in which the pathologic changes have been found only in the pulmonary artery system. We have had the opportunity of studying two patients who were shown to have such localization.

REPORT OF CASES

CASE 1.—A boy aged 5 years 10 months was referred for evaluation of his cardiac status.

Pregnancy, delivery, and neonatal period were normal. Weight gain during infancy was slow. Motor development was normal. Other than upper respiratory infections and the difficulties referable to the heart he had had no specific illnesses.

Except for diabetes in the maternal grandmother there was no history of a significant congenital, hereditary, familial, or communicable disease in either ascendency.

At 6 weeks of age he was found lying in his crib with respiratory distress and cyanosis. A diagnosis of thymic compression was made, and x-ray treatments were given. Thereafter he seemed well. At age 3 years the parents were told that he had congenital heart disease. At age 5, seven months prior to admission to Hahnemann, he developed congestive failure, with dyspnea, orthopnea, hepatomegaly, peripheral edema, and marked cardiac enlargement. He was treated with digitalis and mercurial diuretics and responded well. Following his recovery he received a daily maintenance dose of digitalis.

As noted above, cyanosis was first noted at the age of 6 weeks. Thereafter it was constantly present in lips and nailbeds, becoming more marked on exertion and during the course of upper respiratory infections. Since first ambulation he had exhibited easy fatigue and shortness of breath on mild exertion. During the 6 months prior to admission his exercise tolerance had further decreased to the point that he was unable to climb three steps. The parents were aware that he had always been quiet and withdrawn, showing little interest in play. He had perspired profusely throughout life. His left anterior thorax had protruded since age 3 years. There had been no syncope, convulsions, epistaxis, headaches, chest pain, or paresthesias of the lower extremities.

On physical examination he was found to be underdeveloped but rather well nourished. There was slight cyanosis of the lips, none of the nail beds. The cervical veins were slightly distended. There was some degree of deviation of the trachea to the right. The bony thorax was markedly asymmetrical, the left anterior chest being much more prominent than the right. The lungs were clear. The heart was greatly enlarged to right and left. A diffuse systolic thrill was most prominent in the fourth and fifth left interspaces. The cardiac rate was 84/minute. There was a normal sinus rhythm. The pulmonic second sound was accentuated 3+. Of maximal intensity in the third and fourth left interspaces near the sternal border was a long, loud, harsh systolic murmur which could be heard over the entire thorax. The liver edge was palpable 4 cm. below the right costal margin. The femoral pulsations were weak. Blood pressure: arms, 120/78; legs, 116/70. Height 40 in.; weight 37 lb.

Laboratory Data.—The erythrocytes numbered 5,700,000/cu. mm., with 14 gm. of hemoglobin. There were 7100 leucocytes, with 65 polymorphonuclear, 32 lymphocytes, 3 monocytes. There were no abnormal urinary elements. The electrocardiogram showed right ventricular strain. On films and fluoroscopy the pulmonary vascular markings were found to be moderately accentuated, and there were congestive changes in the right lung. The main pulmonary artery could not be definitely delineated. The heart was greatly enlarged to right and left and in the right anterior oblique view obliterated the retrosternal space to a high level. Cardiac pulsations were feeble.

Hospital Course.—Following the initial studies it appeared that ventricular septal defect, atrial defect, and Ebstein's malformation of the tricuspid valve were the chief diagnostic possibilities. From the character of the femoral pulse and the blood pressure determination there was believed to be,

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From the Division of Pediatrics and Pathology, Hahnemann Medical College and Hospital of Philadelphia, and the Bailey Thoracic Clinic.

† Dr. Herbert Braunstein supplied the data on three of his patients.

in addition, some degree of coarctation of the aorta. To clarify the situation cardiac catheterization was performed. The pulmonary artery could not be entered. From the manner in which the catheter coiled in the right atrium the chamber was thought to be very large. Right ventricular systolic pressure was of the same order of magnitude as the systemic. Right atrial mean and right ventricular end diastolic pressures were elevated. There was a left-to-right shunt at the ventricular level, and the arterial oxygen saturation of 83.5% was evidence of an accompanying right-to-left shunt.

Because the child's outlook appeared hopeless it was decided that an attempt should be made to correct the ventricular septal defect surgically. However, during exploration cardiac action ceased, and all attempts at resuscitation failed.

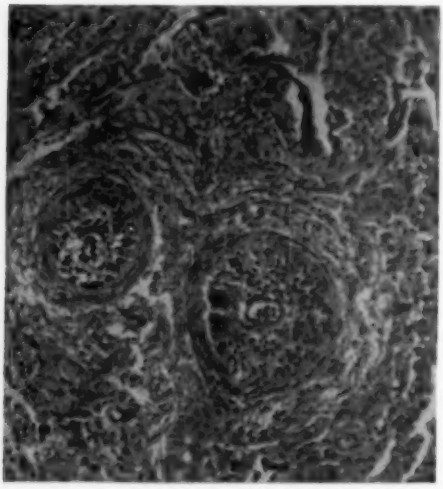


Fig. 1.—Two small pulmonary arteries revealing necrosis of inner layers of media and intima with leucocytic infiltration, edema, and occasional multinucleated giant cells; reduced approximately ¼ from mag. × 100.

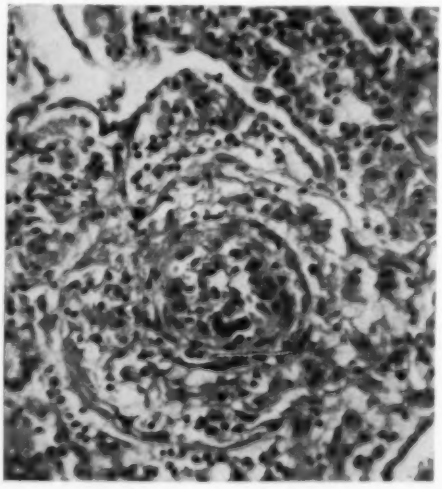
At autopsy the heart was found to be markedly enlarged, weighing 240 gm. The right atrium was dilated and its wall hypertrophied. The right ventricle was also dilated. The myocardium measured 0.8 mm. in thickness. Left heart chambers were normal. The ascending aorta and arch were not remarkable. At the isthmus the vessel became narrowed, and from this point to the diaphragm remained somewhat constricted, although there was an adequate lumen. The pulmonary artery was dilated. The foramen ovale was anatomically patent but during life had probably been functionally closed. In the membranous portion of the interventricular septum was a defect measuring 2.0×2.0 cm. It was

Fig. 2.—Larger artery, showing focal necrosis and aneurysmal dilatation with extension of inflammatory cells in perivascular zones; reduced approximately ¼ from mag. × 100.

immediately below the aortic ring. Tricuspid, pulmonic, mitral, and aortic valves were normal. Section of the lung revealed marked congestion.

The significant microscopic findings were limited to the lung and were noted in all lobes. The capillaries and venules were engorged with erythrocytes. Homogeneous, pink-staining edema fluid was pres-

Fig. 3.—Higher magnification of small artery depicting the severe narrowing of the vessel lumen due to inflammatory edema and necrosis; reduced approximately ¼ from mag. × 100.



ent in many alveoli. The most striking pathologic changes were manifest in the arterioles and the small and medium-sized arteries. The media of the latter was hypertrophied and the intima thickened. There was edema of the thickened intima. The smaller arteries and arterioles were affected similarly, although medial hypertrophy was more pronounced. In addition, in the wall of many vessels were large foci of necrosis, with infiltration of neurtophiles, a few eosinophiles, and occasional plasma cells. These changes were more pronounced in the inner layers of the media and the intima. Also present were occasional multinucleated giant cells. There was minimal adventitial and perivascular inflammatory reaction except in rarely encountered larger arteries where small areas of aneurysmal dilatation encroached on the adjacent parenchyma. The intense arteritis had resulted in such a marked widening of the vascular wall that only an extremely small lumen remained in each vessel. Although no new thrombi were seen, occasional vessels were found which were partially occluded by organized, recanalized thrombi. In these vessels occasional lymphocytes were still present in the wall and adventitia (Figs. 1-3).

Throughout the lung parenchyma, particularly adjacent to bronchi, granulomatous lesions composed of centers of epithelioid cells and Langhans giant cells and peripheral lymphocytes were seen. Stains for tubercle bacilli and fungi and polarization revealed no organisms or crystals, and no other foreign inclusions were found in these tubercle lesions.

CASE 2.—A girl aged 7 years 4 months was referred for evaluation of her cardiac status.

Pregnancy, birth, and neonatal periods were normal. Weight gain during infancy had been satisfactory and motor development normal. Past illnesses included frequent upper respiratory infections. These became severe at age 3 years and were attributed to allergy. Skin tests showed her to be sensitive to grasses, dust, and pollens.

A premature sibling had died shortly after birth. Otherwise there was nothing of significance in the family history.

At age 5 years 3 months tonsillectomy was performed. One month later, while at the seashore, the parents one day noticed that her legs were swollen. There followed the development of dyspnea, a dry cough, and cyanosis. A physician discovered ascites. Fever, orthopnea, and oliguria appeared. She was hospitalized, and a diagnosis of congenital heart disease with congestive failure was made. Digitalis and mercurial diuretics brought about prompt improvement in her condition, and she was discharged on a maintenance dose of both drugs. Her condition improved further during the next four months but then began to deteriorate. She was admitted to the original hospital, where cardiac catheterization was performed. The pulmonary artery could not be entered. Right atrial pressure was markedly elevated. Right ventricular pressure was 100/30. There was no evidence of a left-to-right shunt between the chambers or the great vessels. Arterial oxygen saturation was normal. At the time of discharge it was suspected that she might have Ebstein's malformation of the tricuspid valve or Ayerza's disease. At no time during her course had a cardiac murmur been heard. Thereafter, her downhill course continued, with increasing cyanosis and respiratory distress.

In retrospect, the parents recalled that although they had considered her to be perfectly normal prior to the discovery of her swollen legs, she had actually for several months become short of breath on moderate exertion. Throughout her life she had preferred to be physically quiet. She had always perspired profusely. There had been no syncope, convulsions, epistaxis, hemoptysis, headache, or chest pain.

On physical examination the child appeared gravely ill, being undernourished and having a peculiar waxy pallor. Her conjunctivae were pink. There was slight cyanosis of the lips and nail beds. There were no abnormal pulsations of the cervical vessels, and the trachea was in the midline. The bony thorax was asymmetrical, the left anterior chest being more prominent than the right. The lungs were clear. The heart was enlarged to the left. There was no thrill. The cardiac rate was 120/minute, and there was a normal sinus rhythm. The cardiac sounds, particularly the pulmonic second, were extremely loud and clear, with an unusual tympanitic quality. No murmur was heard. The liver edge was palpable 6 cm. below the right costal margin and was extremely firm, pulsating, and nontender; there was slight pitting edema of both feet, the lower legs, and the sacrum. On the arms and legs were many scars with a purple pigmentation, representing, according to the mother, scratches which had healed very slowly. Peripheral pulses were normal. Blood pressure in the arms was 104/84. It could not be measured in the legs because of the child's great discomfort. Height 45 in.; weight 45 lb.

Laboratory Data.—The erythrocytes numbered 5,200,000/cu. mm., with 15.2 gm. of hemoglobin. There were no abnormal urinary elements. The electrocardiogram showed abnormal P waves and right ventricular strain. On films and fluoroscopy the pulmonary vascular markings were normal or small. The main pulmonary artery was dilated. The heart was enlarged to right and left, the increased size being due to involvement of the right side. Cardiac and pulmonary pulsations were small.

Hospital Course.—At the time of admission the child was in extreme distress. Dyspnea was so

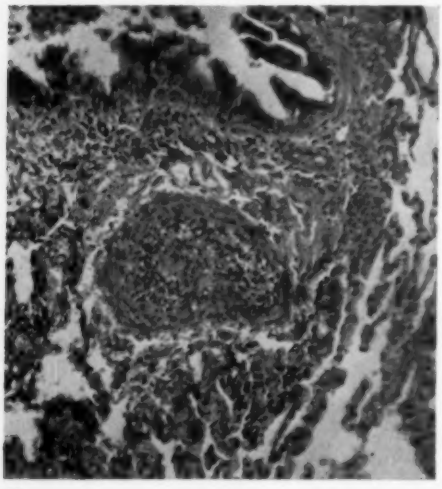
severe that she could say no more than two or three words in succession. On the basis of the preliminary studies, together with the catheterization data from the other hospital,* such conditions as primary pulmonary hypertension, pure pulmonary stenosis, and Ebstein's malformation appeared to be possibilities. Cardiac catheterization was scheduled, but her condition was so poor that it appeared she could not survive the procedure unless aided by anesthesia, tracheal intubation, and manual respiration. It was decided that exploratory surgery would entail no greater risk and if pulmonary stenosis were found there would be some hope of permanent improvement. Otherwise, she was doomed.

At the time of operation, the right heart was quickly explored by an intracardiac finger. Except for the impression that the tricuspid valve was markedly incompetent, no abnormalities could be found. The myocardial incision was closed. Cardiac contractions then became very weak and after a few moments ceased. Resuscitative efforts were fruitless.

At autopsy the heart was enlarged and flabby and weighed 170 gm. The pulmonary artery was markedly dilated. The aorta was normal. The ductus arteriosus was closed. The right atrium was dilated. The right ventricle was also dilated, and its wall measured 7 mm. in thickness. The left ventricular myocardium was thickened, measuring 13 mm. The cardiac septa were intact. The tricuspid ring was widened, and it did not appear that the valve could have been competent during life. All valve cusps were normal.

* Supplied by Dr. C. R. E. Wells.

Fig. 4.—Fibrinous thrombus occluding lumen of small artery with adjacent zone of intimal and medial necrosis; reduced approximately ¼ from mag. × 100.



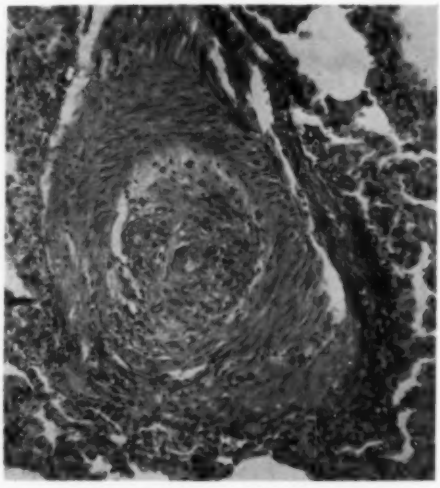


Fig. 5.—Organized, recanalized thrombus in larger pulmonary artery with thickened muscular wall. Occasional lymphocytes are present in the wall and adventitia; reduced approximately ¼ from mag. × 100.

Pertinent microscopic findings were limited to the liver and lungs. In sections of the former was evidence of advanced cirrhosis, with marked distortion of lobular architecture. There was marked fibrous proliferation in the portal zones, with irregular replacement of the peripheral lobular liver cells. Bile-duct proliferation and moderate lymphocytic and eosinophilic infiltration were also found. Occasional collections of fat vacuoles were present in the liver cells. Distended bile canaliculi were also seen.

In the lungs there was medial and intimal thickening of small and medium-sized arteries similar to Case 1. Necrotizing changes were also seen in many of these vessels, characterized by intense neutrophilic infiltration and destruction of the inner two-thirds of the media and extension to the intima. There was severe perivascular leucocytic reaction with capillary and fibroblastic proliferation. No fibrinoid necrosis or giant cells were seen (Figs. 4 and 5). There was pronounced focal fibrous thickening of alveolar walls, particularly in the paravascular and parabronchial zones of both lungs, together with lymphocytic infiltration. Foci of atelectasis and adjacent emphysema were noted throughout.

The cardiac lesion in Case 1 was similar to that in two patients previously reported. Old and Russell [1] detailed the history of an

11-year-old boy who had been known to have a heart malformation from the time of birth. He had chronic cyanosis, clubbing of the digits, and exertional dyspnea. During the last month of life he suffered an illness marked by fever, cough, vomiting, persistent headache, and chilliness. The only details given of the physical examination (performed six hours before death) were the appearance of acute illness, poor development, and a loud, blowing systolic murmur which was best heard at the apex.

At autopsy the chief cardiac lesion was a 4×11 mm. defect in the membranous portion of the interventricular system. In addition, there was chronic mitral and aortic valvulitis. Necrotizing arteritis was found in the tertiary radicles of the pulmonary artery and in the arterioles. No other vessels were involved.

Another 11-year-old boy was described by Kipkie and Johnson.[2] He was cyanotic at birth, when a diagnosis of congenital heart disease was made. Bouts of exertional dsypnea and easy fatigue were noted as he grew. Five weeks before death he received a sulfonamide because of a throat infection, although he was known to have had an adverse reaction to the drug (weakness and dizziness) seven months previously. Two and one-half weeks later, swelling of the abdomen and periorbital edema appeared. There followed increasing shortness of breath, oliguria, and dark urine. His blood pressure was elevated; he had ascites and an elevated nonprotein nitrogen level. Death occurred 35 days after the onset of the throat infection.

At postmortem examination were found a defect in the membranous portion of the ventricular septum, glomerulonephritis, and necrotizing arteritis confined to the pulmonary vessels.

In two other cases reported in some detail there was also heart disease; in both, rheumatic mitral stenosis. Parker and Weiss[3] tell of a 33-year-old woman who had mitral stenosis with chronic failure and pulmonary edema. In sections of her lungs, rare vessels undergoing necrotizing arteriolitis were found. Case 2 of Symmers' contribution[4] was a 34-year-old man with rheumatic heart disease which resulted in recurrent episodes of congestive heart failure. He was found at autopsy to have severe mitral stenosis and necrotizing arteritis of the smaller branches of the pulmonary artery.

Mention must be made, too, of four patients described by Braunstein.[5] Three had had long-standing mitral stenosis, and in the fourth the atrial septum was absent. All had necrotizing arteritis confined to the lung.

Kirshbaum,[6] McKeown,[7] Symmers,[4] Maxwell and Wilson,[8] and Braunstein[5] have reported the lesion in patients who had no structural disease of the heart. Kirshbaum's subject was a 9-year-old girl who in the four months prior to death showed evidence of progressively severer heart disease. At autopsy the heart, except for evidence of increased work, was normal. There was necrotizing pulmonary arteriolitis.

McKeown, in referring to four cases, presents no clinical data other than the ages (10, 13, 24, 32 years) and the fact that three presented evidence of right heart failure of several months' duration. All showed acute and healing arteritis of large, medium, and small pulmonary vessels.

Symmers' first case was a previously healthy 24-year-old man who developed progressive right heart failure and died in 18 months. The heart was free from abnormalities. Extensive necrotizing arteritis was present in the smaller branches of the pulmonary artery tree.

Case 2 in the paper of Maxwell and Wilson was a 19-month-old boy who from the age of 6 months exhibited signs of severe heart disease. At autopsy the left pulmonary artery was found to be considerably smaller than the right. Necrotizing arteritis involved approximately one-half the medium-sized pulmonary arteries on the left.

Braunstein's fifth case had a structurally normal heart and necrotizing arteritis confined to the pulmonary artery system.

All of these patients had, in addition to the necrotizing arteritis, changes consisting of medial hypertrophy and intimal thickening.

COMMENT

In searching for something common to all these patients, it is apparent that some thought must be given the fact that 9 of the 18 had a cardiac lesion; 3 had a defect of the membranous portion of the ventricular septum; in 1 the atrial septum was absent, and the remaining 5 had severe, long-standing mitral stenosis. In each of these conditions there tend to develop pulmonary vascular changes, consisting of medial hypertrophy and intimal thickening. For eight of the nine, the information is available that these changes were present. The remaining patient was described as having the Eisenmenger complex. It would be surprising if the same changes were not present in this boy, even though they are not mentioned.

The etiology of these vascular changes is not clear. We[9] have postulated that in ventricular septal defects some mechanism effects contraction of the smaller pulmonary vessels. The resulting narrowing of the lumina results in increased resistance to pulmonary flow. To sustain the contraction medial hypertrophy occurs. The hypertension induced by the narrowing of the lumina is traumatic to the intima, and it responds by thickening. Thus a cycle is set up which may progress to virtual obliteration of the vascular tree. The same mechanism plays a role in defects of the atrial septum. Mitral stenosis, by hindering blood flow from the left atrium, causes hypertension in that chamber and the pulmonary veins. The right ventricle must meet this rise by increasing the force of its contraction. The increased pressure is transmitted through the pulmonary artery system. The hypertension brings about the same changes mentioned above.

Thus it is reasonable to suppose that in the nine patients with heart disease, the necrotizing arteritis was merely superimposed on an already severely damaged vascular system. Insasmuch as there is no reason to think that in the other cases the arteritis caused the medial hypertrophy and intimal thickening which was described in each case, it is equally reasonable to suppose that they, too, had preexisting pulmonary vascular damage and now superimposed necrotizing arteritis. The genesis of vascular changes in the lungs of an individual without heart disease is unknown. One might advance the hypothesis that through some chemical, neural, or neurochemical mechanism, functional constriction of the vessels is brought about. There then follows the same process suggested above.

The question to be considered next is why was the necrotizing process confined to the pulmonary artery system? The only explanation coming to mind is a generality: In answer to a stimulus supplied by an agent, a certain tissue will respond according to innate susceptibility, inferior resistance, or special affinity. Perhaps the preexisting vascular changes presented certain peculiarities which made this tissue the target of a hypersensitivity reaction or of an infectious process. The definitive answer to the question might solve the problem of hypersensitivity states and the collagen diseases.

SUMMARY

Two cases are presented in which necrotizing arteritis was confined to the pulmonary artery system. One patient had a ventricular septal defect of physiologic significance; the other a heart free of the stigmata of congenital or rheumatic disease. Both had severe cardiac symptoms.

Several cases collected from the literature are briefly summarized. Eight of these patients had heart disease.

Each of the nine individuals with heart disease had a lesion which is commonly complicated by pulmonary vascular changes consisting of medial hypertrophy and intimal thickening. These were described as being present in eight and were not mentioned in one. The patients without heart disease also had these changes in addition to necrotizing pulmonary arteritis.

It seems reasonable to suppose that the necrotizing arteritis was merely superimposed on an already damaged vascular bed, the damage in all cases being due to pul-

monary hypertension. The genesis of the hypertension is discussed.

Localization of the necrotizing arteritis in the pulmonary artery system was probably due to the fact that the preexisting changes made it the preferred target for a hypersensitivity reaction or an infectious process.

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News and Comment

ANNOUNCEMENTS

Research Fellowship in Poliomyelitis.—A Research Fellowship in poliomyelitis is now available in the Department of Pediatrics at Stanford University School of Medicine. This Research Fellowship, known as the Elizabeth Kenny Fellowship in poliomyelitis, is a three-year fellowship. A stipend to $5000 to $6000 per year is provided.

Applicants should be trained in pediatrics and have some experience in the field of virology. The candidate is required to spend two-thirds of his time in the research program and one-third in clinical teaching. An additional sum of $5000 to $6000 is also available to conduct the research.

Applicants should write directly to Chairman, Department of Pediatrics, Stanford Hospital, Clay & Webster Sts., San Francisco 15.

PERSONAL

Scroll Presented to Dr. Bret Ratner.—At an open meeting of the Section on Allergy of the American Academy of Pediatrics, held at the Palmer House in Chicago, on Oct. 3, 1955, a scroll was presented to Dr. Bret Ratner, of New York, by Dr. Jerome Glaser, of Rochester, N. Y., Chairman, in behalf of the Section. The scroll reads as follows:

By unanimous vote of the Section on Allergy of the American Academy of Pediatrics assembled in Chicago at the Twenty-Third annual meeting of the Academy, this scroll is awarded to

Bret Ratner, M.D.

as an expression of gratitude and appreciation for his untiring services in advancing pediatric allergy:

As a pioneer investigator and teacher.

As organizer of the Section on Allergy and as its first chairman.

For his successful efforts in obtaining recognition by certification for pediatric allergists in the sub-specialty of pediatric allergy.

LICHEN SCLEROSUS ET ATROPHICUS IN CHILDHOOD

SOL P. DITKOWSKY, M.D.
ALFRED B. FALK, M.D.
NORMAN BAKER, M.D., Springfield, Ill.
and
MORTON SCHAFFNER, M.D., Aurora, Ill.

THE INFREQUENCY of published studies appearing in the pediatric literature pertaining to lichen sclerosus et atrophicus during childhood prompts this report of our observations covering an eight-year period.

The condition was first described by Hallopeau,* in 1887. Twenty years later reference to the disease appeared in the American literature. Since then articles pertaining to this entity have been, in the main, concerned with the manifestations found in adults. Points stressing the differentiation of lichen sclerosus et atrophicus from kraurosis vulvae, lichen planus, and scleroderma have been clearly defined.

The findings in the adult usually consist of grouped, frequently confluent, irregularly shaped, flat-topped white papules located most frequently on the upper aspect of the trunk, vulva, and anus. The area of distribution of the pilosebaceous apparatus may be involved with keratotic plugging of this system. In an advanced state atrophy occurs, and the presence of keratotic plugging may be discerned with difficulty. Finally all that remains is a thin tissue-paper-like scar at the involved site. About 85% of the cases reported occur in women and girls. Involvement is limited to the vulva and anus in about 15% of the above.

Submitted for publication June 30, 1955.

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Departments of Dermatology, Children's Memorial Hospital and the University of Illinois College of Medicine, Chicago (Dr. Falk).

* Cited by Wallace and Nomland.[3]

In children, the majority of the cases reported are in girls. The appearance of the lesions is the same as in the adult, but the location of the eruption is not as varied. The vulva and perianal areas are usually the sole sites affected, the eruption forming a figure-eight-like configuration. The tissues, especially about the clitoris and perineum, are swollen, white, and excoriated. Tiny hemorrhages, the result of scratching, may be present. At the onset of the condition subjective symptoms may be absent and the presence of the eruption determined only as a finding in the general physical examination.

The following eight patients are white girls with lichen sclerosis at atrophicus. The diagnoses were based on the clinical findings, with confirmation by microscopy on dermal specimens removed from the affected vulval sites.

CASE 1.—A 4-year-old girl was seen because of a vaginal discharge and itching about the genitals. Examination revealed white plaque-like lesions over the vulva (Fig. 1). Local therapy was of no particular value, and the lesions became more extensive. However, two years later spontaneous improvement began. At the age of 12 years there were no subjective complaints, although a slight residue of the disease remained about the clitoris.

CASE 2.—The patient was seen for a periodic physical examination at the age of 5 years. At this time typical lichen sclerosus et atrophicus lesions were seen about the clitoris and labia minora, with extension posteriorly to the perianal area. Several months previously the girl had been treated for a pinworm infestation. A mild allergic rhinitis was troublesome at times. When she was 7 years of age, spontaneous improvement began. Eighteen months later there remained only limited involvement of the upper zone of the labia majora and perianal tissues. At the present age of 13 years there are no signs of any previous pathology.

CASE 3.—A 5-year-old girl, while undergoing the usual periodic examination, was found to have early changes of lichen sclerosus et atrophicus limited to the upper portions of the labia minora. There had been no subjective complaints except for frequent episodes of constipation. The past history was non-

Fig. 1.—Lichen sclerosus et atrophicus in a girl aged 4 years.

contributory aside from eczema as an infant. Spontaneous involution during the following year removed all traces of the previous involvement of the genitalia. Treatment consisted of the occasional local use of petrolatum, a mild boric acid ointment, and avoidance of trauma.

CASE 4.—A 5-year-old girl was seen because of a vaginal discharge and rash about the anus. In the past constipation had been a problem, with several episodes of fecal impaction. Examination revealed lesions of a thickened, whitish plaque-like nature involving the vaginal introitus. Later the lesions appeared on the labia and anus. In the past the child had had an allergic rhinitis due to ragweed and dust. The lesions of the genitalia varied in appearance, with an exacerbation of itching when fecal impaction occurred. When last seen at the age of 12 years, only a mild plaque-like lesion persisted over the clitoris and labia minora.

CASE 5.—A girl aged 3¾ years old had itching of the vulva present for one month. On examination white smooth patches of involvement were located on the vulva, extending posteriorly to the rectal area. Spontaneous involution occurred with complete clearing by the age of 8 years.

CASE 6.—A girl 6¾ years of age had a vaginal discharge of recent origin. Examination revealed typical lesions of lichen sclerosus et atrophicus located on the anterior portion of the labia minora with excoriations about the anus. A rectal smear revealed the presence of pinworm eggs. These were eradicated by appropriate therapy. The genital lesions showed slow, gradual improvement until involution was complete by the age of 14 years.

CASE 7.—A 6¾-year-old girl, while undergoing a periodic physical examination, was found to have several white areas located on the upper part of the labia minora and clitoris. This was proved to be lichen sclerosus et atrophicus. The genital lesions gradually spread. When she was 9 years of age, the eruption extended over the perineum and encircled the anus. All lesions disappeared by the time she was 12 years old.

CASE 8.—A girl, aged 5½ years, while having her periodic physical examination was seen to have a thickened, dry, white skin over the vulva. In the past she had been troubled with eczema and asthma. A year later no eruption could be found; the genital lesions had disappeared spontaneously.

Microscopic studies on specimens of tissues from the above eight cases revealed the following consistent findings: hyperkeratosis, keratotic plugging, atrophy of the prickle-cell layer of the epidermis, with edema of the upper corium and a midzone inflammatory infiltrate (Fig. 2). These are typical findings of lichen sclerosus et atrophicus.†

The etiology of this disease is unknown. Of the eight cases just presented, three had a history of pinworm infestation and six had some allergic type manifestation. We question any causal relationship in this chance association. Many patients have pinworms or allergic diathesis, whereas few have lichen sclerosus et atrophicus.

† References 4 and 5.

Fig. 2.—Lichen sclerosus et atrophicus in a girl aged 5 years.

Treatment is unsatisfactory. The avoidance of trauma seemed to prevent extension and possibly aided in obtaining earlier involution in some of these patients. Too, febrile states, especially the exanthemata, aggravated the local findings. The improvement in the child is slow, gradual, and spontaneous, taking months or years to arrive at a cure.

When involution occurs, the zone about the clitoris is the last to improve. Treatments that have been used with varying success include cool, soothing compresses, bland pastes, estrogens, antihistamines, vitamins, x-ray therapy, carbon dioxide snow, and corticosteroids. The last seems to be most beneficial in alleviating subjective discomfort.

SUMMARY AND CONCLUSIONS

Eight cases of lichen sclerosus et atrophicus in young girls have been observed.

Improvement is slow and spontaneous, with eventual clearing in all cases.

Treatment is generally unsatisfactory and at best gives only temporary relief from pruritus.

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Obituaries

H. B. WILCOX, M.D.
1874-1955

Herbert Budington Wilcox, a member of the American Pediatric Society since 1913 and its president in 1940, died on Feb. 1, 1955, at the age of eighty years.

Of New England stock, Dr. Wilcox was born in Brooklyn, on July 1, 1874. He graduated from Yale College in 1898 and from Columbia University's College of Physicians and Surgeons in 1902. Following two years of internship at St. Luke's Hospital in New York, he engaged for the ensuing thirty-five years in the practice of pediatrics. Early in his career he was associated with the Children's Medical Division of Bellevue Hospital, rising through the grades until, in 1920, he became Director of the service, a position which he held until 1925, when he was appointed Physician-in-Chief at Babies Hospital. During all of these years he held teaching appointments in pediatrics at Columbia, culminating in 1921 when he was called to succeed L. Emmett Holt Sr., as Carpentier Professor of Diseases of Children.

Dr. Wilcox played a prominent role in bringing about the close affiliation between Babies Hospital and the College of Physicians and Surgeons which led the hospital in 1929 to abandon its clinical isolation in the center of Manhattan and to become one of the components of the newly opened medical center of Washington Heights. His administrative skill, his tact, and his enthusiasm made it possible to effect a complex transformation which involved both a geographical move and a reorientation of goals and to bring it off smoothly and without loss of operating momentum.

Convinced that the teaching group in pediatrics ought to have a fulltime nucleus which included the department head, and believing himself unqualified for the role, he resigned his position as executive officer of the university department in 1931. During the ensuing eight years while he remained on the hospital's staff he cooperated in complete harmony with his colleagues, including his successor in office, and gave liberally of his time and experience in directing a number of projects in research and patient care, even while maintaining an active consulting practice in the center of the city. His interest in clinical pediatrics was centered largely in the phenomena of behavioral and emotional growth and on their parallelism with somatic growth and development. In large measure he was a pioneer in psychosomatic pediatrics.

In 1939 Dr. Wilcox became Director of the New York Academy of Medicine, thereby assuming a full-time administrative post in a large organization devoted to the interests of the medical profession and through them of the general public. For several years he had taken an increasingly active part in Academy affairs, having served as chairman of the Pediatric Section, as trustee, and as vice-president, so that he was thoroughly familiar with its policies and objectives. The period of Dr. Wilcox's administration was for the most part encumbered with the frustrations imposed by shortages of personnel and equipment during war years; yet he was able to keep the general program in operation, sustain the morale of his staff, and lay the groundwork for postwar extension. Although much of the physical

and organizational expansion of the Academy of recent years actually took place after his resignation from the directorship in 1946, to him belongs credit for its planning and preparation.

He had looked forward to retirement and to the enjoyment of his country home in Orford, N. H., on the east bank of the Connecticut River. Realization of this hope was in large measure denied by progressive circulatory impairment and by the advent of a cerebral vascular occlusion which left him with partial hemiplegia and motor aphasia. The pleasure he derived from the visit of a friend was clouded by his inability to find words with which to express his thoughts. Some of the great resources of advancing years, the joy of reminiscence, and the exchange of recollection were thus unfortunately denied to him. Although he bore his impairment with philosophic courage, the burden of his disability could never be quite shaken off.

Dr. Wilcox was a man of wisdom, particularly in his understanding of people. By expecting only the best of those who worked with him he usually brought out the best they could give. He had a keen wit, the pace of which left the literal-minded trailing far in the rear. He liked people and had a sympathetic understanding of their desires and ambitions, and this was surely a significant component of his administrative skill and success. A host of friends pay tribute to his life and to his contribution to pediatrics.

Abstracts from Current Literature

Metabolism; Infant Feeding; Milk and Other Foods

SOME OBSERVATIONS ON THE METABOLISM OF VITAMIN B_{12} BY JAMAICAN CHILDREN. S. J. PATRICK, J. Nutrition **55**:129 (Jan. 10) 1955.

The following work was undertaken by S. J. Patrick as part of an investigation of the nutritional status of children in Jamaica, B. W. I. A dietary survey had indicated that these children had a low intake of animal protein, and it was thought possible that they might be deficient in vitamin B_{12}. The experiments included (1) the determination of the plasma levels of vitamin B_{12} in children who had received supplements of the vitamin by mouth and in unsupplemented children; (2) an attempt to "saturate" two children by repeated intravenous administrations of vitamin B_{12}; (3) determination of the plasma levels of vitamin B_{12} and the percentage of excretion of the vitamin by children to whom a test dose of the vitamin had been administered. The children were almost all of mixed African descent and ranged in age from 8 to 15 years. Equal numbers of boys and girls were used.

His data showed that there was no significant difference in the amounts of vitamin B_{12} excreted in the urine by the three groups of children. The "resting" vitamin B_{12} activity of the plasma of the retarded children was raised by the administration of the dietary supplements of B_{12}.The test dose of B_{12} caused consistently higher plasma B_{12} levels in the retarded children after they had received the vitamin dietary supplementation, but the rate of removal of B_{12} from the plasma appeared to be substantially unaltered. The "normal" children showed higher plasma B_{12} levels after the test dose than did the "retarded" children; the differences are insignificant. Most of the injected B_{12} is removed from the plasma within two hours, which is in accord with the pattern of urinary excretion of B_{12}. However, a small proportion of the injected B_{12} appears to remain in the plasma for some time.

FREDEEN, Kansas City, Mo.

GALACTOSEMIA WITH CATARACTS: REPORT OF A CASE, WITH NOTES ON PHYSIOPATHOLOGY. JOSEPH A. RITTER and EDWARD J. CANNON, New England J. Med. **252**:747 (May 5) 1955.

A case of galactosemia with cataracts in a 6½-year-old girl is reported.

Melituria in early infancy and childhood suggests the possibility of galactosemia, and its identity should be confirmed by appropriate tests, including paper chromatography.

The physiopathological aberrations may be due to direct toxic action by galactose on the cells or, more probably, to interference with availability of glucose for proper cell metabolism.

The normal metabolism of galactose is not clear. Available knowledge indicates the fault in galactosemia to be in the conversion of galactose-*l*-phosphate to glucose-*l*-phosphate.

WHEELOCK, Washington, D. C.

IMPORTANCE OF POTASSIUM IN HEAT EXHAUSTION IN FIBROCYSTIC DISEASE OF THE PANCREAS. SEYMOUR J. HARRIS and RICHARD L. LESTER, New England J. Med. **253**:223 (Aug. 11) 1955.

Children with mucoviscidosis have been shown to excrete increased amounts of sodium, chloride, and potassium and therefore to be unusually susceptible to heat exhaustion.

The authors present two cases of heat exhaustion in children with mucoviscidosis and emphasize the necessity for the use of the potassium as well as sodium chloride in both active and prophylactic treatment of this disorder.

A brief review of the pertinent features of potassium metabolism is presented.

WHEELOCK, Washington, D. C.

THE INFLUENCE OF ORALLY ADMINISTERED ANTIBIOTICS UPON THE NITROGEN BALANCE OF INFANTS. P. BERTOYE, R. FERRANDO, and H. MARBOUX, Pédiatrie **10**:5, 1955.

Nitrogen balance determinations in infants who received Aureomycin were found to be elevated, particularly if the antibiotic was given in therapeutic doses. The increase of growth factor producing micro-organisms and the facilitation of intestinal absorption were thought to be the cause for the nitrogen retention.

GLASER, Baltimore.

CUPREMIA IN DYSTROPHIC INFANTS. F. PANIZON and F. CANTARUTTI, Lattante **26**:24 (Jan.) 1955.

The copper content of the sera of nine dystrophic infants was found to be abnormally low. Control tests on the sera of two undernourished infants with pyloric stenosis were found to be normal. The suggestion is presented that these low values are related to differences in the chemistry and distribution of the serum proteins.

HIGGINS, Boston.

NOTES ON THE PHYSIOLOGICAL AND PATHOLOGICAL BEHAVIOR OF THE KETONE BODIES IN CHILDREN. E. EGIDI and M. MALASPINA, Minerva pediat. **7**:148 (Feb. 10) 1955.

Approximately 67% of the elimination of the ketone bodies is by the excretion of acetone by the breath in both normal and diabetic patients. Using the butter tolerance test, the excretion of acetone bodies by normal children is greater that the increased excretion in children already ketonemic. Children with dystrophia adipogenitalis develop a lower degree of ketonemia than normal children when the butter tolerance test is given.

HIGGINS, Boston.

MANIFESTATIONS OF VITAMIN DEFICIENCY IN NURSING WOMEN, L. NÜRNBERGER, Med. Klin. **23**:972 (June 10) 1955.

Human milk contains most of the known vitamins, so the nursing woman needs a greater supply, and a deficiency in food, in enteral production or disturbance of resorption, can result in deficiency symptoms which are discussed.

AMBERG, Rochester, Minn.

DIAGNOSIS AND TREATMENT OF GALACTOSEMIA AND PHENYLKETONURIA. H. BICKEL, Monatsschr. Kinderh. **103**:81-84 (Feb.) 1955.

Diagnosis of phenylketonuria can be established by the demonstration of phenylpyruvic acid and phenylalanine in fresh urine. Addition of a few drops of a 10% ferric chloride solution to the urine results in an olive-green reaction. Phenylalanine can be demonstrated by paper chromatography.

Galactosemia can be proved by the demonstration of galactose in the urine. Paper chromatography of blood can specifically elicit even small amounts of galactose.

Both galactosemia and phenylketonuria (phenylpyruvic oligophrenia) are inborn, hereditary (recessive) diseases. Patients with phenylpyruvic oligophrenia are usually physically normally developed but exhibit marked mental retardation. Patients with galactosemia are usually infants with prolonged jaundice, hepatosplenomegaly, albuminuria, frequent vomiting, and poor development. Cataracts have been observed as early as the first few months of life but usually are not reported until the end of the first year.

Treatment of galactosemia consists of galactose-free feedings, such as Nutramigen. Three patients with phenylketonuria were treated with a diet low in phenylalanine. The diet was high in carbohydrates and fats and very low in proteins. Amino acids were supplied in the form of a casein hydrolysate from which phenylalanine had been removed by adsorption with activated animal charcoal. In all patients normal values for phenylalanine in blood and urine and phenylpyruvic acid in the urine were obtained. Ages of the patients treated were 2, 2½, 5, and 8 years. There seemed to be improvement in the mental status of the children. It was felt that treatment in the first few months of life may achieve the best results in this disease, that is, before irreversible brain damage has occurred.

HARTENSTEIN, Syacuse, N. Y.

Prematurity and Congenital Deformities

ANENCEPHALY IN TWINS: DIAGNOSED ANTE PARTUM BY ROENTGEN EXAMINATION. RU-KAN LIN and HENRY P. PLENK, Am. J. Roentgenol. **73**:219-225 (Feb.) 1955.

This is the first report in the literature whereby this diagnosis has been made in twins ante partum. There is a review of the literature as to the theories on the etiology of this disease. The clinical signs which are of importance are hydramnios, especially during the seventh and eighth months of pregnancy, uncertain or feeble heart sounds, and abdominal pain due to convulsive movements of the fetus.

The diagnosis is made radiographically by noting the absence of the bony calvarium. Occasionally absence of the calvarium may be mimicked by rapid movements of the fetus, but even

here, the prominence of two small round bony knobs, the sphenoids, is characteristic of anencephaly. Defects of the base of the skull, the pituitary fossa, and the orbits may be observed at times as additional radiographic evidence.

ALTMAN, Miami, Fla.

NATIONAL SURVEY OF CONGENITAL MALFORMATIONS RESULTING FROM EXPOSURE TO ROENTGEN RADIATION. STANLEY H. MACHT and PHILIP S. LAWRENCE, Am. J. Roentgenol. **73**:442 (March) 1955.

This study is based on a questionnaire sent to 3751 radiologists and 3858 physicians in the medical specialities not ordinarily exposed to radiation; 74.1% of the radiologists and 53.8% of the controls responded to the questionnaire. This is a most complete survey and serves as excellent source of material for anyone interested in this problem.

The study involves only the visible effects on the first generation of offspring. Some of the important conclusions are as follows:

1. The number of offspring was the same statistically per person among radiologists (2.69) as among controls (2.67).

2. The incidence of multiple births showed no statistical difference.

3. Fetal deaths showed no significant statistical variation.

4. Congenital defects were 6.01% in radiologists and 4.82% in the controls, which was statistically significant.

5. Exposed persons reported a significantly higher proportion of cardiovascular anomalies than nonexposed persons.

ALTMAN, Miami, Fla.

COMPARISON OF FETAL AND INFANT DEATH RATES IN THE PROGENY OF RADIOLOGISTS AND PATHOLOGISTS. JAMES F. CROW, Am. J. Roentgenol. **73**:467 (March) 1955.

The study attempts to determine whether or not the fetal and infant death rates are statistically different in the families of radiologists as compared with medical personnel not working with ionizing radiation.

The conclusions in this study were based on the reply of 655 radiologists responding to 1027 questionnaires and 530 pathologists responding to 1036 questionnaires. They failed to reveal any statistically significant difference between the frequency of stillbirth and miscarriages in the wives of radiologists, as compared with a control group of pathologists' wives. The infant mortality rates were also not significantly different in the two groups.

ALTMAN, Miami, Fla.

CONGENITAL AMPUTATION OF THE FOREARM. GEORGE T. AITKEN and CHARLES H. FRANTZ, Ann. Surg. **141**:519-522 (April) 1955.

Congenital amputation of the forearm is a characteristic deformity. The stump is usually very short. The abnormality is a unilateral phenomenon with a slight predilection for females.

An upper-extremity juvenile amputee should be fitted with a prosthesis at 4 years of age. At this stage the self-help patterns requiring two-handed skills are developing.

The young amputee when beginning school should be accompanied by the parent, prosthetic instructor, or therapist. The teacher should be thoroughly instructed in the mechanics of the prosthesis. The normal curiosity of classmates should be satisfied by demonstrations of skill with the device. Once explained, little further attention is directed to the prosthesis and its wearer.

BANTIN, Omaha.

MASKLIKE FACIES WITH ASSOCIATED CONGENITAL ANOMALIES (MOBIUS SYNDROME). A. NISENSON, A. ISAACSON and S. GRANT, J. Pediat. **46**:255 (March) 1955.

At first glance the newborn infant who cries without moving his face, who sleeps without completely closing his eyes, and who has trouble nursing is taken for a case of pseudobulbar palsy or traumatic facial nerve injury. Add to this unilateral or bilateral loss of eye abduction, other cranial nerve weakness, club foot, dislocated hips, syndactylism, and other congenital anomalies of the extremities. That's the Mobius syndrome. It's rare and not a family disease. The face does not mirror the mind, as most of these flat-faced children have normal intelligence.

MACDONALD, Pittsburgh.

MATERNAL HYDRAMNIOS AND CONGENITAL ANOMALIES OF THE CENTRAL NERVOUS SYSTEM. RICHARD A. PRINDLE, THEODORE H. INGALLS, and SAMUEL B. KIRKWOOD, New England J. Med. **252**:555 (April 7) 1955.

One hundred forty-five pregnancies complicated by hydramnios were studied. These pregnancies terminated in the delivery of 68 defective infants, including 45 with anencephalus, 8 with spina bifida, 6 with hydrocephalus, and 4 with Mongolism.

The relationships of seasonal distribution, mother's age, birth order, parity, and the mother's health to the hydramnios are discussed.

Ninety-one placentas were examined, and of these only twenty-four were normal. The abnormalities are listed.

The authors discuss the various theories as to the etiology of hydramnios, all of them involving some association with general metabolic and local placental disturbances that would be expected to embarrass placental-fetal circulation. These disturbances make their presence felt usually in the first trimester of pregnancy. Obviously this study indicates the need to explore the whole system of prenatal deaths and infant defects as they relate to maternal disease.

WHEELOCK, Washington.

A CASE OF THE STATUS BONNEVIE-ULLRICH WITH ARTHROGRYPOSIS. E. SEGNANI and P. N. DE SARIO, Minerva pediat. **7**:136 (Feb. 10) 1955.

A case report is presented of a 9-year-old girl who showed the clinical findings of both the Bonnevie-Ullrich and the arthrogryposis syndrome. The opinion is expressed that both syndromes are due to injury occurring during embryonic life, but at separate times.

HIGGINS, Boston.

NEWER ASPECTS IN PREMATURE INFANTS, PREMATURITY, AND PEDIATRICS. ARVO YLPPÖ, Rev. españ. pediat. **10**:761-770 (Nov.-Dec.) 1954.

This is a review of the problems of prematurity in general, with specific attention to feeding, oxygen therapy, hyaline membrane disease, interstitial pneumonia, retrolental fibroplasia, and infectious diseases.

ALLEN, Santa Fe, N. Mex.

RESPIRATORY ALTERATIONS IN THE NEWBORN AND PREMATURE INFANT AS OBSERVED AND TREATED IN CUBA. EMILLO SOTO PADERA, Rev. españ. pediat. **10**:771-775 (Nov.-Dec.) 1954.

The author reviews respiratory diseases in the period from 1940-1953 in his service at the University of Havana. During this time, 54,427 full-term infants and 2512 premature infants were born. The mortality in the full-term infants was 1.5%; in the premature infants it was 14.27%.

The alterations he describes were those found on autopsy of 700 full-term and 200 premature infants. It is interesting that he discounts the significance of the hyaline membrane in pulmonary lesions. Massive or segmentary atelectasis was not as significant as the partial collapse noted in the primary lobule and the gaseous blocking of the noncollapsed portions of the lung. These noncollapsed portions may be covered with hyaline membrane. This portion of the lung may appear microscopically and radiologically functional, but physiologically it is not. This apparent paradox would lead one to suspect that the syndrome of hyaline membrane is an atelectasis by reabsorption.

The author outlines his treatment, which includes aspiration of the upper respiratory tract and evacuation of the stomach immediately after birth, the use of oxygen in a humidifying chamber, and the use of a detergent such as Triton W. R. 1339.

The use of the detergent is as a liquefying agent rather than merely breaking up particles. It serves also to diminish surface tension, which in turn favors the utilization of oxygen into the respiratory tree. The oxygen is never to be over 50%. Best results were obtained when 36% to 40% was used.

The use of antibiotics is described.

ALLEN, Santa Fe, N. Mex.

CYTOLOGICAL EXAMINATION OF LEUCOCYTES WITH THE "ALDER ANOMALY." W. KOSENOW and H. R. WIEDEMANN, Ztschr. Kinderh. **76**:4, 1955.

The authors studied leucocytes with the so-called Alder's anomaly in Pfaundler-Hurler's dysostosis multiplex, which consists of a peculiar granulation of leucocytes, particularly of the eosinophiles. Vital observations and staining as well as conventional May-Grünwald Giemsa smears and cytochemical methods were employed.

The granules are suspected to be rich in lipids, but the authors feel that further studies, such as tagging with radioactive substances and microspectrometric and microelectrophoretic examinations, may yield further information about the nature of these granules.

GLASER, Baltimore.

Newborn

A CONSIDERATION OF THE IMPORTANCE OF ROUTINE RH GROUPING IN INDIA. J. K. G. WEBB, Indian J. Pediat. **21**:147-150 (July) 1954.

The author reports that the mortality from hemolytic disease of the newborn will be approximately 1 in 12,000 deliveries where routine Rh typing is done and full facilities for treatment are available. Where this is not the practice the rate will be 1 in 1200. The avoidable mortality rate where Rh typing and treatment are available is 1 in 1350, while where such is not the case the rate will be 1 in 4000. This difference is significant, and the author feels that routine typing should be generally practiced. The need is even more urgent in the field of blood transfusions, where 2% of all transfusions, if not Rh typed, will cause sensitizations.

MCGUIGAN, Evanston, Ill.

THE RH FACTOR OR ERYTHROBLASTOSIS. J. P. JAFFE and J. RABKIN, South African M. J. **28**:633-638 (July 24) 1954.

Thirty-seven cases of erythroblastosis were reviewed and analyzed. The article contains nothing to add to the current knowledge of erythroblastosis.

MCGUIGAN, Evanston, Ill.

MECONIUM ILEUS AND ITS TREATMENT. M. BETTEX, Helvet. paediat. acta **9**:323 (Oct.) 1954.

Meconium ileus, earliest clinical disturbance produced by pancreatic fibrosis or mucoviscidosis, poses to the surgeon unusual diagnostic and therapeutic problems. It is not always possible to make with certainty the etiological diagnosis of a neonatal ileus. Therefore there is no doubt that laparotomy has to be performed. Once meconium ileus and its potential complications have been recognized, several operative techniques come under consideration, depending on the extension of the lesions. Pancreatic extract, administered from operation on (administration of pancreatic extract into the intestinal lumen by enterotomy), and continual duodenal drainage form the basis of treatment. Forced evacuation of the abnormal meconium, as it is inefficient and traumatic, should be avoided. Beyond the surgical stage, the treatment is as for pancreatic fibrosis.

Two cases are reported in detail. They are probably identical premature twins, one of whom was treated with success.

FROM THE AUTHOR'S SUMMARY.

PULMONARY HYALIN MEMBRANE IN THE NEWBORN. RENE MONTERO DE LA PEDRAJA, ERNESTO FERNANDEZ DEL MORAL, JULIO SAENZ, JORGE BEATO NUNEZ, RAMON CONSUEGRA, BRANLA PRASCHNICK, and MIGUEL BALAIS, Arch. med. inf. **23**:303 (Oct.-Dec.) 1954.

Two cases of hyaline lung membrane are described, constituting the first observation of this anomaly in Cuba. The probable etiopathogenesis of this interesting nosological entity is discussed. As a relatively valuable diagnostic sign the so-called clinicoradiological paradox of the American authors is described. The anatomopathological findings in the two cases are presented.

FROM THE AUTHORS' SUMMARY.

PROTHROMBIN FACTORS V AND VII IN THE NEWBORN. G. PASSARO, Arch. ital. pediat. e puericolt. **17**:59, 1955.

The author has studied prothrombin and Factors V and VII in 41 newborn infants. The "prothrombinemia" determined by Koller and co-worker's method supplies values reduced to

under 50% and with an average of 37% identifiable with those obtainable by the method of two stages. Reduction of this factor was found also in the second week of life. Factor V is normal in newborn infants. Factor VII is constantly and distinctly reduced, with a value that corresponds to a 25% of that found in adults. This reduction persists in the second week of life. The combined determination of prothrombin and Factor VII supplies a further confirmation of reduction of these factors.

The author relates the scarcity of prothrombin and Factor VII to the peculiar hemochemical state of globulins in newborn infants and considers that this scarcity is likely to produce a functional insufficiency of the reticuloendothelial system due to production of globulins.

FROM THE AUTHOR'S SUMMARY.

TEMPERATURE REGULATION OF INFANTS AND PREMATURES. R. SERAPHIN, Ztschr. Kinderh. **75**:644, 1955.

Vasomotor temperature regulation upon hot and cold stimulation was studied on the palms of five full-term infants 6-10 weeks old and eight premature infants. It was found that the vasomotor reaction of full-term and premature infants is as prompt and extensive as in adults.

The thermolability of young infants and premature infants is therefore not caused by immaturity of their temperature regulating centers but rather by their unfavorable surface-volume ratio and other factors, such as low activity, thin skin, and fat pad.

GLASER, Baltimore.

DIAGNOSTIC PROBLEMS OF HEMOLYTIC DISEASE OF THE NEWBORN. J. REEPMAKER and J. H. VAN BOLHUIS, Maandschr. kindergeneesk. **22**:181-203 (June) 1954.

A survey is given of many of the problems concerning the hemolytic disease of the newborn due to Rh, ABO and other blood-group incompatabilities. The physical, hematological, and serological findings are reviewed. The differential diagnosis is discussed and illustrative case histories and a case of congenital familiary hyperbilirubinemia are present. Finally, the problems of kernicterus and its differential diagnosis are discussed. Kernicterus may be due to blood-group incompatability as well as to other causes.

VAN CREVELD, Amsterdam.

SCLEREMA ADIPOSUM NEONATORUM CURED BY CORTISONE TREATMENT. K. C. M. FAUSER, Nederl. tijdschr. geneesk. **98**:549-555 (March) 1954.

Sclerema adiposum neonatorum occurred in a prematurely born pair of monozygotic twin boys 24 hours after birth. Treatment was with ACTH in a dose of 1 mg. every three hours. No effect was seen. Cortisone was tried in a dose of 5 mg. every 12 hours. Immediate improvement was seen. A short discussion of a possible etiology is given. No new views are given. Intramuscular ACTH administration is not advised, as resorption might be slow. The possibility of an immature adrenal is mentioned. Spontaneous cure of this disease is rarely seen.

VAN CREVELD, Amsterdam.

PROCONVERTIN CONTENT IN THE BLOOD OF NEWBORN FULL-TERM INFANTS. C. A. M. VAN DER MEY and J. C. ENS, Nederl. tijdschr. geneesk. **98**:1157 (April 24) 1954.

In a number of normal newborn infants, some of whom received vitamin K and some none, the changes in the proconvertin content (e. g., one of the prothrombin conversion factors) were studied. It appeared that next to the physiological hypoprothrombinemia there exists a physiological hypoconvertinemia, which can be favorably influenced by the administration of vitamin K. The possible clinical significance of these changes is stressed.

In the blood of the umbilical cord the proconvertin content is greatly decreased; in the blood of women at the end of pregnancy this content is highly increased.

VAN CREVELD, Amsterdam.

THROMBOPLASTIN FORMATION IN THE BLOOD OF THE NEWBORN. S. VAN CREVELD, S. I. MIRANDA, C. G. M. NAGEL, J. H. NIJENHUIS and A. P. TJON SIEN KIE, Nederl. tijdschr. geneesk. **98**: 2742 (Sept. 25) 1954.

The formation of thromboplastin in newborn full-term and premature infants was studied by means of the thromboplastin generation test (*Biggs* and *Douglas*, 1953). It was found that throm-

boplastin formation in newborn premature infants occurs distinctly more slowly than in newborn full-term infants and that it takes several weeks before this thromboplastin formation in premature infants becomes normal. It could be demonstrated that this disturbed thromboplastin formation is related to a temporary decreased activity of a factor present in serum, probably the P. T. C. or Christmas factor. The possible clinical significance of this finding is stressed.

VAN CREVELD, Amsterdam.

Acute Contagious Diseases

HEMATOLOGICAL CHANGES OCCURRING IN CHILDREN BEING TREATED FOR PERTUSSIS BY ACTH. G. DI GRUTTOLA and U. DE BELLIS, Pediatria **62**:531 (July) 1954.

Very satisfactory clinical improvement followed the treatment of 15 children with pertussis, using ACTH. The total white blood cell counts and the lymphocyte: neutrophile ratios became normal within 6 to 10 days.

HIGGINS, Boston.

TREATMENT OF ACUTE MENINGOCOCCICA. G. BARTOLOZZI and S. BORGHERESI, Riv. di clin. pediat. **54**:358 (Nov.) 1954.

It is not undoubted that the count of peripheral blood eosinophile cells is a certain sign of adrenocortical function. In a series of conditions of stress (infections, trauma, frostbite, burns, etc.) the number of eosinophile cells shows a marked decrease that may reach values of 0 (the normal range of eosinophiles should be about 200 per cubic millimeter) and then revert to normal as soon as the state of stress disappears. It has been found that the drop of eosinophiles follows an increase in the 17-hydroxycorticosteroid secretion.

In the present paper the behavior of eosinophile cells was observed in eight cases of meningococcal infections. Initial levels of 55 and 66 eosinophiles per cubic millimeter were found in two cases presenting the typical symptoms of very acute meningococcal infection; in the remaining six cases, with meningococcal infection of medium gravity associated with meningitis, the initial level varied from 0 to 5.5 per cubic millimeter. Therefore the high level of eosinophile cells, occurring in condition of acute infection, was understood to be a sign of inadequate adrenocortical function, suggesting, on the contrary, the low initial level in the other six cases an adequate adrenocortical response.

The very acute meningococcal infection is mainly referable to two different factors: the infective factor and the general collapse factor. With the use of antibiotics and chemotherapy the problem of the first factor has been overcome; nevertheless, the patients die if no powerful remedy against the serious state of collapse is taken. It is well known, nowadays, that the state of shock is due to acute adrenocortical insufficiency. An adequate replacement therapy associated with an antibacterial therapy is absolutely necessary in order to keep the patient alive till the antibacterial therapy produces its effects. In consideration of the low response obtained using aqueous adrenal cortex extracts and DOCA, the two cases with very acute meningococcal infection were treated with cortisone, already successfully tried by American physicians in two similar cases, and the antibiotic therapy was maintained for several days after the discontinuance of cortisone.

In the first case, cortisone was administered in daily doses of 50 mg. for six days and 25 mg. during four days. In the second case the doses were 50 mg. for the two first days, 37.5 mg. in the third day, and 25 mg. the fourth day. In both cases there was in the first 24 hours a regression of the serious initial state of collapse, followed by the disappearance of the semicomatose condition and fever; consequently there was also a progressive improvement of general health conditions. Hemorrhagic signs did not appear further, and they ceased in a short time.

Cortisone has been associated with the usual therapy even in the treatment of meningococcal infection of medium gravity with or without meningitis, being administered in daily doses of 25-50 mg. for a few days. A prompt regression of initial toxic state and hemorrhagic signs was obtained. This therapy, however, did not produce any effect, either positive or negative, on the course of duration of meningitis. In short, the use of cortisone was proved invaluable in the treatment of meningococcal infections; therefore the authors conclude that cortisone therapy plays a most important role in the treatment of very acute meningococcal infections and may produce some good effects in the treatment of meningococcal infections of medium gravity.

FROM THE AUTHORS' SUMMARY.

ACUTE INFECTIOUS LYMPHOCYTOSIS AND POLIOMYELITIS. T. M. KLEY, Maandschr kindergeneesk. **22**:321-329 (Oct.) 1954.

Acute infectious lymphocytosis may occur without any symptom or may be associated with a variety of symptoms. Most of these symptoms are mild, such as inflammation of the upper respiratory tract, diarrhea, slight fever. The absolute and relative lymphocytosis with normally shaped lymphocytes is the most important diagnostic criterion. Some cases of acute infectious lymphocytosis have been described in which involvement of the central nervous system occurred.

The course of an acute infectious lymphocytosis in a 3-year-old girl is described. The child was admitted as a case of poliomyelitis. She fell ill six days before admission, with fever, pain in the neck, and diarrhea. One day prior to admission partial paralysis of one leg was noted. A short time after admission partial paralysis developed in the other leg, with pain in both legs. There were also changes in the knee jerks. Ten days after hospitalization the patient's condition improved, and at discharge one month later the child's condition was excellent. Atrophy of the right leg persisted. From the stool of this patient Columbia SK virus was isolated in mice. Inoculation in monkeys resulted in isolation of Columbia SK virus and of poliomyelitis virus Type II. The serum of the patient contained neutralizing antibodies against Columbia SK virus. The presence or absence of poliomyelitis antibodies is not mentioned.

VAN CREVELD, Amsterdam.

WHAT WOULD HAVE BEEN THE EFFECT ON THE PARALYSIS AND CASE FATALITY RATE IF IN THE 1952 EPIDEMIC OF POLIOMYELITIS IN LIMBURG (HOLLAND) IF GAMMA-GLOBULIN PROPHYLAXIS HAD BEEN APPLIED ON THE LINES ADVOCATED BY THE AMERICAN RESEARCH COUNCIL? G. D. HEMMES, Nederl. tijdschr. geneesk. **98**:479 (Feb. 20) 1954.

In 1952 an epidemic of 1712 cases of poliomyelitis occurred in the Netherlands. From 343 cases in the province of Limburg, 314 had a paralysis, with 18 fatalities. If the results from the Hammon experiment had been known in January, 1953, and the same instruction for the prophylactic γ-globulin therapy of the families had been followed, it should have been necessary to treat 1716 persons. If all children from 0-4 years had been treated with γ-globulin, the number of patients with serious symptoms should have decreased from 56 to 53 and the fatality rate from 18 to 17-18. The prophylactic treatment nearly always would have been too late.

VAN CREVELD, Amsterdam.

GAMMA-GLOBULIN IN PROTECTION AGAINST POLIOMYELITIS. M. F. POLAK, Nederl. tijdschr. geneesk. **98**:485 (Feb. 20) 1954.

The author describes a model epidemic constructed from the actual conditions in the year 1943 at Amsterdam, with 574 cases of paralytic poliomyelitis. In the 26th week of this epidemic the initial morbidity figure was 49 cases per 100,000 persons. To protect the children from 0-4 years of age, 59,000 children should have received γ-globulin. One paralytic case would have been prevented by 490 injections of γ-globulin. If there was more than one case in a family the injections would often have come too late. The author's conclusion from these studies is that prophylactic use of γ-globulin should not be rejected in advance.

VAN CREVELD, Amsterdam.

ACTH THERAPY OF POSTVACCINAL ENCEPHALITIS. T. HOGEWIND, Nederl. tijdschr. geneesk. **98**:1303 (May 8) 1954.

The author describes a 9-year-old patient with encephalitis postvaccinalis. The child was treated with ACTH (50 units per day, divided over five injections) with favorable results.

Attention is drawn to the difficulties which exist in judging the results of this therapy.

VAN CREVELD, Amsterdam.

Acute Infectious Diseases

THE APPLICATION OF THE MIDDLEBROOK-DUBOS HEMAGGLUTINATION TEST IN TUBERCULOSIS OF CHILDREN. C. B. CHOREMIS and K. N. ANASTASEA, Am. Rev. Tuberc. **70**:139 (July) 1954.

The authors found a correlation between activity of the tuberculous process and height of the titer of the hemagglutination reaction. Highest values were obtained in miliary tuberculosis,

next highest in tuberculous meningitis. Low titers were found during periods of clinical recovery, but values were also low during the period shortly before death. ROYCE, Pasadena, Calif.

THE RISK OF DEVELOPING TUBERCULOSIS AMONG CHILDREN OF TUBERCULOUS PARENTS. L. D. ZEIDBERG, ANN DILLON and R. S. GASS, Am. Rev. Tuberc. **70**:1009 (Dec.) 1954.

In an effort to concentrate control efforts on the most vulnerable segments of the population, 733 children of white tuberculous parents were studied. The attack rate was 3.3 per 1000 person-years among children of sputum-positive parents, compared with 1.8 for children of a parent in whom no bacilli were demonstrated. Those children less than 5 years of age and the 15-24-year age groups were found to be most susceptible, males predominating in the younger group and females in the older.

ROYCE, Pasadena, Calif.

RISK OF PARALYTIC AND NONPARALYTIC FORMS OF POLIOMYELITIS TO HOUSEHOLD CONTACTS IN NONEPIDEMIC YEARS. MORRIS SIEGEL, MORRIS GREENBERG and PHILIP STONE JR., New England J. Med. **252**:752 (May 5) 1955.

The probability of clinical infection among household members after the onset of poliomyelitis in the family was studied in New York City during the nonepidemic period of 1950-1953, inclusive.

The data examined were obtained from an investigation of 3028 household units in which one or more cases of poliomyelitis occurred during the four-year period of observation. Multiple cases were reported in 2.7% of these households.

The probability that paralytic infection would develop in household members after the onset of a case in the family was greater when the initial case was paralytic than when it was nonparalytic. On the other hand the risk of subsequent nonparalytic infection seemed to be greater when the initial case was nonparalytic. These differences were most striking among household members under 15 years of age.

The attack rate among household members after the occurrence of the first case compared to that observed in the general population was greater in the nonepidemic years of 1950-1953 than in the epidemic of 1949.

WHEELOCK, Washington, D. C.

PROPHYLAXIS AGAINST GROUP A STREPTOCOCCI IN RHEUMATIC FEVER: THE USE OF SINGLE MONTHLY INJECTIONS OF BENZATHINE PENICILLIN G. GENE H. STOLLERMAN, JEROME H. RUSOFF and ILSE HIRSCHFELD, New England J. Med. **252**:787 (May 12) 1955.

The authors summarize their experience and interpret the data of others as follows. No recurrences of rheumatic fever were observed among 145 patients with rheumatic fever who received monthly injections of 1,200,000 units of benzathine penicillin G during a two-year period.

Evidence of infection was noted in but four of these patients during the period of study. Only one of the four had a clinically apparent pharyngitis associated with a positive culture for Group A streptococci and a rise in antistreptolysin O titer. The remainder had either a rise in antibody or a positive culture for Group A streptococci as sole evidence of infection.

Cardiac lesions progressed in three patients who had rheumatic heart disease at the beginning of the study. Those who did not have apparent rheumatic heart disease at the beginning of the study did not have cardiac lesions subsequently.

Reactions considered to be due to penicillin hypersensitivity occurred in 5 of 410 patients who received an average of 12 monthly injections per patient.

Single monthly injections of 1,200,000 units of benzathine penicillin G confer a high degree of continuous protection against infection with Group A streptococci and afford a reliable means of protecting the patient against recurrences of rheumatic fever.

A critical analysis of this article appears concurrently in the form of an editorial. Certain objections to the whole-hearted acceptance of this means of prophylaxis are raised, among them the lack of a controlled study for comparison, the existence of hypersensitization of a delayed as well as immediate type, the local discomfort, the narrow range of protection, the necessity for parenteral dosage for full efficiency, and other objections. This article should be read by all who deal with long-term bacterial prophylaxis in children.

WHEELOCK, Washington, D. C.

STUDIES IN THE HOME TREATMENT OF STREPTOCOCCAL DISEASE. DANIEL M. MOHLER, DAVID G. WALLIN and EDWARD G. DREYFUS, New England J. Med. **252**:1116 (June 30) 1955.

The authors questioned the adults responsible for the home administration of penicillin orally to 217 children. The diseases being treated were acute streptococcal pharyngitis or otitis media, and the dosage schedule was three 200,000 unit tablets a day for seven days.

Seventy patients (32.39%) received less penicillin than was prescribed. The most prominent reason for not giving enough penicillin was the fact that the patient felt well after on two days of therapy, and further medication was considered unnecessary. Other reasons are given.

This survey suggests that more emphasis must be directed toward the repetitious insistence that responsible adults give oral penicillin exactly as prescribed for the indicated period. Otherwise this method of treating streptococcal disease, either actively or prophylactically, will be unsuitable for the purpose intended.

WHEELOCK, Washington, D. C.

FATAL NEONATAL POLIOMYELITIS. R. C. B. PUGH and J. A. DUDGEON, Arch. Dis. Childhood **29**:381 (Oct.) 1954.

A fatal case of acute poliomyelitis in a newborn infant under treatment for ectopia vesicae and epispadias is described. The infection was successfully transmitted to a rhesus monkey. The possible mode of infection and the occurrence of visceral lesions in poliomyelitis are discussed.

KELLY, Milwaukee.

OBSERVATIONS CONCERNING THE TUBERCULIN TESTING PRELIMINARY TO BCG ACTION. T. BAUMANN, Schweiz. med. Wchnschr. **85**:575-578 (June 11) 1955.

It is recommended to use the Moro tuberculin patch test to determine tuberculin sensitivity in children up to 10 years of age. If negative, BCG vaccination is performed after 72 hours. From the 11th year on, the Moro patch test is applied first; if negative, a Mantoux test is made, and if this is also negative, in 72 hours BCG is given. The effect of the general condition of the individuals to be tested on the response to tuberculin is discussed, distinguishing normergic-anergic, optimal anergic, hyperergic, or hypoergic-dysergic or negative anergic states.

AMBERG, Rochester, Minn.

THE WHITE BLOOD CELL PICTURE IN ENCEPHALITIS AFTER VACCINATION. F. PUNTIGAM and K. BERGER, Schweiz. med. Wchnschr. **85**:604-608 (June 18) 1955.

Material was collected from Austria comprising 106 cases of encephalitis after the first smallpox vaccination. The children were 2 to 14 years old. The absolute number of leucocytes fundamentally was like that of uncomplicated smallpox vaccinations. For more details the paper is to be consulted.

AMBERG, Rochester, Minn.

PENICILLIN TREATMENT IN CHILDHOOD: DETERMINATION OF PENICILLIN LEVEL OF THE BLOOD AND RESULTS OF TREATMENT WITH A NEW PENICILLIN PREPARATION (TARDOCILLIN). K. SEELEMANN and H. DIETRICH, Deutsche med. Wchnschr. **80**:925 (June 17) 1955.

Tardocillin is a combination of procaine penicillin and N,N'-dibenzylethylenediamine dipenicillin G, for intramuscular injection. Without procaine penicillin it is given by mouth. When given in three doses a day a therapeutically active concentration in the blood is still present after eight hours.

AMBERG, Rochester, Minn.

INFLUENCE OF FLYING HIGH ON THE COURSE OF WHOOPING COUGH. G.-A. HARNACK, Deutsche med. Wchnschr. **80**:958 (June 24) 1955.

A number of infants and children were exposed to an altitude of 3000 meters for one and one-half hours. In 18 of 100 patients the whooping cough disappeared after one week, in 44 the number of attacks was reduced to one-half, and 38 did not respond at all, according to the judgment of a physician against the judgment of the parents, who registered 46 successes, 30 part successes, and 22 negative results. This discrepancy was in part explained by diminution of the severity of the attacks without influencing their number. Mild cases responded better than severe ones.

AMBERG, Rochester, Minn.

EXPERIENCE WITH ERYCIN IN INFANTS AND CHILDREN. W. SIEVERS, Deutsche med. Wchnschr. **80**:961 (June 24) 1955.

Erycin (erythromycin) was given by mouth to infants and children with various bacterial infections with good results. It has the advantage for infants that it does not interfere with the normal coli flora of the intestines.

AMBERG, Rochester, Minn.

Diseases of Blood, Heart and Blood Vessels, and Spleen

STAPHYLOCOCCAL ENDOCARDITIS. A. M. FISHER, H. N. WAGNER, and R. S. ROSS, A. M. A. Arch. Int. Med. **95**:427 (March) 1955.

The authors review the experience at The Johns Hopkins Hospital for the past 20 years and review the data on 38 cases. They give a detailed case report on six recent cases. They point up the increasing problem of the high incidence of antibiotic-resistant strains. The incidence of penicillin resistance during the last five years has been 42%. The survival rate during this period was 54%. They could find no definite correlation with sensitivity of Staphylococcus to penicillin in regard to recovery rates. In general, they felt that administration of massive doses of penicillin together with erythromycin or other antibiotics, irrespective of the results of in vitro tests for penicillin sensitivity, was the treatment of choice.

JONES, Chicago.

TREATMENT OF MACROCYTIC ANEMIAS. RICHARD W. VILTER, A. M. A. Arch. Int. Med. **95**:482 (March) 1955.

This is an excellent article which summarizes and gives in detail the practical aspects of therapy of all the various macrocytic anemias. Although most of the problems deal with adults, the author describes the treatment of megaloblastic anemia of infancy. This article should be read by all those interested in this problem.

JONES, Chicago.

COARCTATION OF THE AORTA WITH SPECIAL REFERENCE TO THE FIRST YEAR OF LIFE. WILLIAM T. MUSTARD, RICHARD D. ROWE, JOHN D. KEITH, and ANNA SIREK, Ann. Surg. **141**:429-436 (April) 1955.

Two-thirds of all cases of coarctation of the aorta present signs or symptoms in infancy.

In this paper the authors give chief consideration to two groups: 1. postductal, under one year of age; 2. preductal, under one year of age.

Over 60% of the babies who present signs and symptoms of the postductal type of coarctation of the aorta under one year of age and 89% of the preductal type are not likely to survive unless treated surgically.

Surgical excision has been performed in 5 babies with the postductal type of coarctation with no operative deaths and in 10 babies with the preductal type of coarctation with five deaths. The deaths were due chiefly to severe associated defects.

The authors discuss diagnosis and operative technique.

BANTIN, Omaha.

ATYPICAL CONGENITAL HAEMOLYTIC ANAEMIA. M. G. NELSON, Arch. Dis. Childhood **29**:457 (Oct.) 1954.

A case of congenital nonspherocytic hemolytic anemia is described.

Clinically the disease was characterized by anemia, jaundice, hepatosplenomegaly, osseous changes, and a Mongoloid-like facies. Crises were absent.

The erythrocytes were macrocytic, showed no spherocytosis, and had a normal osmotic fragility.

The anemia improved following splenectomy, although hemolysis continued. The postsplenectomy hemolysis was unaffected by cortisone therapy.

KELLY, Milwaukee.

A STATISTICAL ANALYSIS OF CASES OF ERYTHEMA NODOSUM DURING THE FIVE-YEAR PERIOD, 1949 TO 1953. G. C. ABBA and D. TARANTOLA, Lattante **26**:19 (Jan.) 1955.

Nineteen girls and 16 boys were treated for erythema nodosum at the Children's Hospital in Brescia over a five-year period. Seven were 2 years old, eleven were 3 to 5 years old, and

seventeen were 6 to 12 years old. Thirty-two had positive tuberculin reactions; each of them had positive exudative pulmonary pathology, which varied from a mild hilar adenitis to extensive parenchymal involvement. Two of the other children had rheumatic cardiac lesions. The third child had a subacute throat infection, with enlarged tonsils.

The opinion is expressed that the etiology of erythema nodosum is an allergic reaction which may occasionally be of uncertain origin.

HIGGINS, Boston.

THE DIAGNOSIS OF LEUKEMIA IN PEDIATRIC PRACTICE. K. QUAISER, Med. Klin. **50**:883 (May 27) 1955.

Since 1945, forty-four cases of parablastic leukemia were admitted. Of these, only nine had been recognized as leukoses. The majority of cases of leukemia in children belong to the acute aleukemic type. The value of the erythrocyte count and the platelet count is emphasized, since an anemia is nearly always present and the platelets are frequently reduced in number and show forms of degeneration. These changes, anemia and platelets, may lead earlier and more frequently to the diagnosis than the white blood cell count. The presence of very unripe paraleucoblasts in circulating blood often establishes the diagnosis; sternal puncture can often do so very early.

AMBERG, Rochester, Minn.

THE RELATIONSHIP BETWEEN HENOCH-SCHOENLEIN'S PURPURA, PERIARTERITIS NODOSA, AND RHEUMATIC DISEASES. H. D. PACHE and W. FREISLEDER, Monatsschr. Kinderh. **103**:123-125 (Feb.) 1955.

Clinical observations, electrophoretic studies, and pathologic anatomy showed that there existed no definite relationship between Henoch-Schoenlein's purpura and rheumatic diseases. The term purpura rheumatica should be discarded.

There seemed to be doubt even as to the hyperergic-inflammatory genesis of Henoch-Schoenlein's purpura. Periarteritis nodosa, however, was believed to be closely related to rheumatic diseases. Therefore, antirheumatic and antiallergic therapeutic measures, such as Pyramidon and ACTH, are indicated in periarteritis nodosa but should not be expected to be of much value in Henoch-Schoenlein's purpura.

HARTENSTEIN, Syracuse, N. Y.

THE OCCURRENCE OF FETAL HEMOGLOBIN IN DISEASES OF THE BLOOD. W. KÜNZER, Ztschr. Kinderh. **76**:58, 1955.

The blood of 47 children and 58 adults with various disturbances of the blood, e. g., anemias in cases of infection, hemorrhage, burns, rheumatic fever, leukemia, pernicious anemia, was tested for alkali resistance of the hemoglobin by a very sensitive method. Such hemoglobin was found to occur in 30% of the children and 14% of adults, usually in concentrations of 0.5% to 2% of the total hemoglobin (only in six cases above 3%). Further tests showed that this hemoglobin is probably identical with fetal hemoglobin.

GLASER, Baltimore.

ENDOCARDFIBROSIS. H. CZERMAK and O. THALHAMMER, Wien. klin. Wchnschr. **67**: (April 1) 1955.

A boy died 15 hours after birth. On autopsy an endocardfibrosis of the left heart, mainly of the left ventricle, was revealed. Furthermore, abnormalities of renal pelvis and ureters were noted on both sides. During the early months of pregnancy the mother had a grippe infection, suggesting the possibility that the defects noted could be consequences of the same illness.

AMBERG, Rochester, Minn.

PRINCIPLES OF A RATIONAL CLASSIFICATION BASED ON HISTOPATHOLOGY OF THE MALIGNANT CHANGES IN THE RETICULOENDOTHELIAL SYSTEM. L. FRUHLING and Y. LE GAL, Acta pædiat. belg. **8**:283, 1954.

Diseases belonging to this group are characterized by systemic new formations of tissues of unknown etiology involving the reticuloendothelial system, including the histiocytes, and infallably leading to death. Until such time as etiologic classification will be possible, the description of the architecture of the newly formed tissues offers the best way of differentiation.

Although all forms are malignant, they can basically be divided into those which destroy and those which do not destroy the tissue in which they grow. In the nondestructive group the authors list Gaucher's and Niemann-Pick's diseases, the leukemias, tumors of the lymphatics located in the glands (parotid, breasts, kidneys, testicles, and ovaries), the reticulohistiocytoses of the adult and of the child (Letterer-Siwe). In the destructive group the authors list Hand-Schüller-Christian's disease, eosinophilic granuloma, Hodgkin's disease, mycosis fungoides, Mikulicz's syndrome, and atypical forms.

GLASER, Baltimore.

DIFFERENTIAL DIAGNOSIS BETWEEN LIPID GRANULOMATOSIS (SCHÜLLER-CHRISTIAN) AND MALIGNANT RETICULOHISTIOCYTOSIS IN CHILDHOOD (LETTERER-SIWE). L. FRUHLING, R. SACREZ, and M. HEUMANN, Acta pædiat. belg. **8**:293, 1954.

On the basis of four case reports with postmortem studies and an extensive review of the literature (88 references), the authors point out the anatomopathological differences of the two conditions. The characteristics of Schüller-Christian's disease are the sponge-like cells, destruction of the tissues in which the lesions originate, and signs of sclerosis and necrosis. These findings are not present in Letterer-Siwe's disease.

GLASER, Baltimore.

REPORTS OF THREE CASES OF MALIGNANT RETICULOENDOTHELIOSIS IN INFANTS. L. CAUSSADE, N. NEIMANN, and M. PIERSON, Acta pædiat. belg. **8**:304, 1954.

Two cases of Letterer-Siwe's disease (ages 9 and 12 months) are described, presenting fever, impairment of the general condition, polymorph skin lesions on trunk and head, hepatomegaly and swelling of lymph nodes, and anemia; the diagnosis was confirmed by biopsy and autopsy. The roentgenographic findings of skull and lungs are described. The third case (22 months), presenting large cervical adenopathies and tumors of the skull with bone destruction, was diagnosed as Schüller-Christian's disease and confirmed by biopsy of a node and a swollen area of the skull.

GLASER, Baltimore.

Diseases of Nose, Throat, and Ear

HEARING AND LANGUAGE EVALUATION WITH HARD OF HEARING CHILDREN. JOHN A. IRWIN and ANNE R. SHREVE, A. M. A. Arch. Otolaryng. **59**:186 (Feb.) 1954.

Four children with nerve deafness in a preschool training program for the hard of hearing were given hearing aids. Each child improved after about a month in areas of memory, picture vocabulary, and number concepts. They also increased the length of their sentences. There was no decrease in lipreading ability.

KIMBALL, Evanston, Ill.

CONGENITAL ATRESIA OF THE ESOPHAGUS WITH TRACHEO-ESOPHAGEAL FISTULA: TREATMENT OF SURGICAL COMPLICATIONS. ROBERT R. SHAW, DONALD L. PAULSON, and ELDON K. SIEBEL, Ann. Surg. **142**:204-213 (Aug.) 1955.

The commonest congenital anomaly of the esophagus consists of an atresia associated with tracheoesophageal fistula.

Surgical correction of congenital atresia of the esophagus with tracheoesophageal fistula results in salvage of the majority of infants born with this anomaly. Complications encountered in the surgical management of this anomaly are still numerous. The early complications are respiratory in nature and are inherent in the threat to the respiratory tract from (1) the regurgitation of gastrointestinal secretions into the tracheobronchial tree through the fistulous opening between the lower segment and trachea and (2) the aspiration of mucus and saliva from the blind upper pouch into the larynx and trachea. The late complications of stricture and recurrence of tracheoesophageal fistula arise from problems concerned with the anastomosing of the two ends of the esophagus. Associated congenital anomalies are present in approximately 25% of these infants, but the presence of these anomalies may not always make it impossible to restore these infants to a near normal state. The prevention and treatment of the complications encountered in dealing with this anomaly are discussed.

BANTIN, Omaha.

DIFFICULTY IN CONDITIONING ELECTRODERMAL RESPONSES TO TONE IN NORMALLY HEARING CHILDREN. ROBERT GOLDSTEIN, JANE T. DANIELS, and SARA B. POLITO-CASTRO, J. Speech & Hearing Disorders **20**:26-34 (March) 1955.

Eighteen normally hearing children were easy to condition and fourteen were difficult to condition to electrodermal responses to tone according to subjective standards used in a previous study. Ease of conditioning seems to be unrelated to intelligence quotient; to sex; to the ages studied (7 years 6 months to 12 years 8 months); to handedness; to initial, terminal, or maximum resistance; to random fluctuations of resistance; to latency of response; or to overt responses and behavior, except for sleepiness. There may be a slight relationship between the ease of conditioning and the minimum resistance recorded during the test.

PALMER, Wichita.

GASTROESOPHAGEAL INCOMPETENCE, PARTIAL INTRATHORACIC STOMACH, and VOMITING IN INFANCY. FREDERIC N. SILVERMAN, Radiology **64**:664-674, 1955.

Cardioesophageal relaxation (chalasia), partial thoracic stomach, congenital short esophagus, and gastroesophageal incompetence in general is the theme of a 10-page article. Many doubts are expressed about the accuracy of identification of the cardioesophageal junction by x-ray, and the author concludes that clear differentiation is not always possible and that two conditions may be identical or different stages of the same condition. "Congenital short esophagus" probably does not exist as an entity but represents esophagitis and cicatricial retraction due to regurgitation of acid gastric contents into the esophagus.

To evaluate the incidence of esophageal reflux, 100 hospitalized infants and children were examined in varying positions after the administration of the standard barium meal. Twenty-seven showed evidence of reflux into the esophagus. Eighteen of the remaining seventy-three had clinical disease associated with vomiting. Under 1 year of age, the number of the vomiting group was appreciably greater, over 5 years, markedly decreased. None of the children who showed reflux had radiologic features suggesting hiatus hernia or chalasia. Postural treatment which frees the esophageal orifice of liquid stomach content is the method of choice.

ANSPACH, Riverside, Ill.

A SERIES OF CASES TREATED WITH RADIUM FOR RECURRENT OTITIS MEDIA AND DEAFNESS. A. W. HALFHIDE, Great Ormond St. J. (No. 7) pp. 22-24, June, 1954.

Thirty-three cases of recurrent otitis media and deafness were treated with a single dose of 940 r at the surface of the nasopharyngeal mucosa. Deafness improved in 26 cases (86.5%), and otitis media was improved in 19 cases (63.5%).

MCGUIGAN, Evanston, Ill.

ETIOLOGICAL ASPECTS OF DISTURBANCES IN SWALLOWING IN THE NEWBORN PERIOD. M. BERNHEIM, R. FRANCOIS, J. A. ROUX, and C. MOURIQUAND, Pédiatrie **10**:70, 1955.

After describing two cases of pulmonary distress due to aspiration of amniotic fluid and/or milk with recovery, the authors describe a very unusual case of swallowing difficulties caused by a congenitally enlarged thyroid gland, diagnosed only at autopsy.

GLASER, Baltimore.

SYNCOPE AS AN INITIAL MANIFESTATION OF OTITIS IN INFANCY. A. FETOZANO, Acta pediat. españ. **13**:158-166 (March) 1955.

The author presents clinical histories of six infants whose first symptom of an otitis media was a convulsive seizure or a collapse with signs of shock.

Most of the children were under 3 years of age, and the shock had to be treated before the initiation of sulfonamide and antibiotic treatment.

ALLEN, Santa Fe, N. Mex.

ANTIHISTAMINIC TREATMENT OF THE ACUTE LARYNGEAL DISTURBANCE IN CHILDHOOD. RAFAEL DE LA PORTILLA, Rev. cubana pediat. **26**:599 (Sept.) 1954.

With the antihistaminic drug the obstructive symptoms of the acute laryngitis promptly disappear, continuing sometimes as a slight case of bronchitis. Bronchopneumonic complications are

avoided and the time of hospital attention is reduced sometimes to a brief period of 24 hours. Finally, surgical procedures are avoided, which may be one of the main benefits derived from this therapy.

FROM THE AUTHOR'S SUMMARY.

THE EPIDEMIOLOGICAL SIGNIFICANCE OF DYSENTERY WITH OTITIS. BELA BOLLOBAS, Monatsschr. Kinderh. **103**:293-297 (June) 1955.

Of 3530 infants and children with bacterial dysentery admitted to a hospital in Budapest, Hungary, 561 patients developed ear complications. Bacteriological examination of the purulent discharge from 135 ears was negative in 53 patients. Dysentery bacilli were never found. In 27 cases cultures yielded Pseudomonas aeruginosa, in 22 cases Proteus, and both organisms in 17 cases. The remainder were Staphylococcus albus, Hemophilus influenzae, pneumococci, and nonhemolytic Staphylococcus.

Of 51 patients who had myringotomies because of otitis media, 38 stopped vomiting following the procedure. Of 32 patients who had mastoidectomies, all ceased vomiting after surgery. In 21% dysentery was thought to be connected with otogenic factors. Fever late in the course of dysentery was found to be related to ear complications. In severe cases dysentery cleared following otologic procedures.

Otitis media as a complication of dysentery was considered important from an epidemiological point of view as it had an unfavorable influence on the course of the dysentery, increased the number of hospital days, and, therefore, caused a rise in the source of infection. Isolation of patients with otitis from other dysentery cases should be considered.

HARTENSTEIN, Syracuse, N. Y.

CONGENITAL HYPERTROPHIC PYLORIC STENOSIS WITH PSEUDOMEMBRANEOUS ESOPHAGITIS. D. P. R. KEIZZER, Acta pædiat. belg. **8**:351, 1954.

A newborn boy showing typical symptoms of pyloric stenosis was operated upon. The general postoperative condition was critical (vomiting continued), and after 36 hours and again after 3 days the baby vomited membranes measuring 1-3 cm. Thereafter the child improved.

Microscopic examination showed fibrin and leucocytes. There were no bacteria, fungi, or muscle fibers. Since trauma, infection (fungal, bacterial), contagious diseases, gavage feedings, etc. cannot be implicated in this case, the author believes that the only remaining etiologic explanation is regurgitation of acid gastric secretion.

GLASER, Baltimore.

Diseases of Lungs, Pleura, and Mediastinum

LOBAR EMPHYSEMA. EUGENE VAN EPPS and DALE H. DAVIES, Am. J. Roentgenol. **73**:375 (March) 1955.

An attempt is made to correlate roentgenographic appearance with clinical symptoms and signs.

The central nervous system complications of hypoxia have been largely ignored, and they may be so severe that in spite of early diagnosis and surgical treatment irreparable changes may occur.

The etiology of this condition includes things as (1) redundant bronchial mucosa acting as a check valve obstruction; (2) deficiency in number or abnormal development of cartilaginous rings; (3) compression by an aberrant vessel as a ductus or ligamentous arteriosis; (4) stenosed bronchi; (5) trauma to lung incident to overstrenuous resuscitation measures at birth. There are cases noted without definite etiological proof.

The clinical story is usually that of a previously normal infant who begins to have dyspnea with or without cyanosis. Examination reveals emphysema with decreased breath sounds, shift of the mediastinum and heart, and substernal retraction.

The x-ray reveals an extensive degree of emphysema, lobar in type, with compression of adjacent lobes, and shift of the heart and mediastinum to the opposite side and posteriorly due to herniation of the lung anteriorly. The diaphragm is flattened or depressed, but is never elevated.

The differential diagnosis includes agenesis of a lobe, cystic disease of a lung, bilateral pneumonitis, atelectasis of one lobe with compensatory emphysema of another lobe, pneumothorax, or foreign body.

When the symptoms are severe, surgery and removal of an involved lung may be life-saving. Spontaneous regression in this condition has previously been reported in two cases by Caffey.

ALTMAN, Miami, Fla.

ON SPONTANEOUS ALVEOLAR RUPTURE AND ITS CONSEQUENCES. EUGENE STRANSKY and AMBROSIA REYES, Philippine J. Pediat. **3**:24-29 (Jan.-March) 1954.

The authors presented two cases of alveolar rupture in early childhood. In the first case there was spontaneous pneumothorax and in the second case mediastinal and subcutaneous emphysema. In both cases the air was removed; in the first case, by closed thoracotomy, and in the second case, by incision of the emphysematous skin. Recovery in both cases was fast and complete. Etiology and symptomatology of alveolar rupture in childhood are discussed.

It was added that there was a third case of spontaneous pneumothorax recently admitted in the pediatric ward. As this case seemed to be a case of pyopneumothorax secondary to lung abscesses after bronchopneumonia, it was not included in this paper.

FROM THE AUTHORS' SUMMARY.

MULTIPLE NON-TUBERCULOUS PULMONARY CALCIFICATIONS. JOHN LORBER, Proc. Roy. Soc. Med. **47**:130-131 (Feb.) 1954.

Multiple calcifications in the lungs of a 5-year-old girl were investigated. Tuberculin, histoplasmin, coccidioidin, and toxoplasmosis tests were negative. The calcifications were considered to be phleboliths.

McGUIGAN, Evanston, Ill.

PULMONARY SEQUESTRATION. M. BÉTHENOD, Pédiatrie **10**:289, 1955.

Pulmonary sequestration is a rather recently recognized entity consisting of cystic malformation of the lungs with a supernumerary artery originating from the aorta and supplying the segment. Histological examination cannot differentiate between this combination of two malformations and acquired cysts. Progress made through antibiotics and pulmonary surgery has permitted the identification of this entity.

The anatomy, pathogenesis, clinical course, radiological findings, and differential diagnostic considerations are discussed.

GLASER, Baltimore.

BULLOUS EMPHYSEMA. A. CAMPANA and E. MALAMAN, Clin. pediat. **37**:61 (Jan.) 1955.

A large emphysematous bleb developed on the right upper lobe of a 16-month-old child following an attack of measles. Frequent x-ray pictures, including stratigraphic views, are presented to show the course of the lesion until its disappearance, two months after it first appeared.

HIGGINS, Boston.

THE SIGNIFICANCE OF INCLUSION BODIES IN THE EPITHELIAL CELLS OF THE PHARYNGEAL MUCOUS MEMBRANES, ESPECIALLY IN INTERSTITIAL PLASMA-CELL PULMONITIS. M. KOLTAY, G. DIÓSSZILÁGYI, and J. TÖRÖK, Clin. pediat. **37**:181 (March) 1955.

The authors report finding inclusion bodies in the mucous membranes of the pharynx in over 1000 cases, including premature and full-term infants, children, and adults; they were found in sick as well as healthy individuals. They were found as frequently in healthy infants as in sick infants and in infants with interstitial plasma-cell pneumonitis. Thus it appears unlikely that the pharyngeal inclusion bodies have any relation to the origin or cause of plasma-cell pneumonitis.

The failure of some investigators to find these inclusion bodies consistently is probably technical; the authors have found them using various stains.

HIGGINS, Boston.

ACUTE TOTAL RESPIRATORY SYSTEM INFECTION AMONG INFANTS HAVING LA GRIPPE. BERNARDO PEREZ MORENO, Acta pediat. españ. **13**:13-34 (Jan.) 1955.

The author describes a condition of the total involvement of the respiratory system in infants seen during an epidemic of la grippe. This is peculiar to children under one year of age and is especially found in immature infants. Pathologically it differed from pneumonia bronchitis and bronchiolitis because the involvement was total, althouugh anatomically there might be a patch

of pneumonia and bronchitis. There were also rhinitis, laryngitis to the point of obstruction, pharyngitis, and tracheobronchitis. There was even typical widening of the nostrils and facial contortions due to the anoxia. The x-rays were not characteristic of lung involvement, but rather showed changes in the position of the diaphragm.

The development of this syndrome is described in detail, along with diagnosis. Prognosis is serious unless immediate heroic measures are taken. Chloromycetin and Aureomycin are useful, but aerosol and inhalations, oxygen, and cardiac stimulants must be ready for use if the child is to survive.

ALLEN, Santa Fe, N. Mex.

A CASE OF ARTERIOVENOUS FISTULA IN THE LUNG. K. K. BOSSINA, Maandschr. Kindergeneesk. **22**:49 (Feb.) 1954.

The author gives the case history of a patient with an arteriovenous fistula in the middle lobe of the right lung. The aneurysm was demonstrated by angiocardiography. The cyanosis disappeared after lobectomy. The pressures in the various chambers of the heart were determined by cardiac catheterization.

FROM THE AUTHOR'S SUMMARY.

VARIOUS SHADOWS IN LUNG (PNEUMATOCELE, LUNG ABSCESSES). EMMA J. MEIJERS, Maandschr. Kindergeneesk. **22**:54 (Feb.) 1954.

This is an attempt to express more precisely the factors which must be clinically understood in a discussion of pneumatocele. A case of multiple lung abscesses which were cured roentgenologically via annular shadows is described.

FROM THE AUTHOR'S SUMMARY.

NEUROGENIC TUMOR OF THE THORAX. J. LANCKNEUS, Maandschr. kindergeneesk. **22**:145-(May) 1954.

The author describes the peculiar evolution in a girl 1½ years old of an intrathoracic neurogenic tumor. According to clinical and pathological data, the tumor seemed benign. However, after removal there were extremely malignant recurrences. The child died at the age of 3 years.

The striking association of the intrathoracic tumor with a persistent diarrhea is stressed.

FROM THE AUTHOR'S SUMMARY.

Diseases of Gastrointestinal Tract, Liver, and Peritoneum

CONGENITAL INTRINSIC OBSTRUCTION OF DUODENUM. WALLACE A. ARNESON and CHARLES W. IHLE JR., Ann. Surg. **139**:95 (Jan.) 1954.

The authors report three successfully treated cases of congenital intrinsic duodenal obstruction. They suggest that duodenal atresia and stenosis are commoner than supposed and that the first examining physician can make the diagnosis by being aware of the triad of persistent vomiting soon after birth, upper abdominal distention, and a characteristic roentgenogram.

Early diagnosis followed by proper surgery should give a high percentage of cures.

BANTIN, Omaha.

DUODENAL STENOSIS IN A NEWBORN CHILD: OBSERVATION OF A NEW PHYSICAL SIGN. C. SEYBERT KINSELL, California Med. **82**:460 (June) 1955.

The patient, a 4-day-old Japanese girl born at term, was examined Jan. 27, 1954, because of persistent vomiting of yellow and green liquid since 12 hours after birth, when the first feedings were started.

The classical signs of early vomiting of bile-colored fluid, upper abdominal distention, scaphoid lower abdomen, gastric peristaltic waves, and the presence of a "pyloric tumor" in the right upper quadrant (distended duodenum) were noted. In addition to these physical signs, it was noted that it was possible to press gas from the stomach through the duodenum to the jejunum with a peculiar feeling as if there were a resistance to the passage of the gas. This was associated with a palpable gaseous "vibration" as if one were feeling borborygmus. This sign, which the author calls the squishing or decompression sign, is due to the gas being passed from the stomach to the lower bowel through a small opening in the membranous obstruction observed in the duodenum. The effect is that of the reed in a wind instrument, and the resultant vibration is distinctly palpable to the examiner.

PRYOR, Redwood City, Calif.

PERFORATION OF THE STOMACH IN THE NEONATAL PERIOD. G. G. ARNOLD, J. Pediat. **46**:276-279 (March) 1955.

This is a report of a boy 5 days old. He had fed poorly since birth. He spit up a lot but had no elevation of temperature. On the fifth day his abdomen was distended. They took an x-ray and found a pneumoperitoneum and free air under the diaphragm. The surgeons opened his abdomen and found a necrotic hole on the anterior surface near the greater curvature, at the junction of the upper and middle thirds of the stomach. They closed it up and the boy improved.

MACDONALD, Pittsburgh.

THE EARLY CORRECTION OF INGUINAL HERNIA. O. C. BRUTON and L. D. HEATON, J. Pediat. **46**:437 (April) 1955.

The authors report 268 infants and children with inguinal hernia. Forty-four of these required emergency operations because of incarceration or strangulation and, of these, thirty-six were under 1 year of age and twenty-six were 6 months or less. They report no cases of incarceration or strangulation past the age of 4 years. They say that, with discretion, repair of inguinal hernia should be done as an elective procedure as soon as possible after the diagnosis is made.

MACDONALD, Pittsburgh.

BLOOD "AMMONIA" CONCENTRATION IN LIVER DISEASE AND LIVER COMA. H. TRAEGER, G. J. GABUZDA, A. N. BALLOU, and C. S. DAVIDSON, Metabolism **3**:99 (March) 1954.

The authors confirmed that the concentration of "ammonia" in the blood is generally higher in patients with liver disease. (The word ammonia is written in quotes because the method of analysis does not distinguish between ammonia and certain diffusible amines.) While there was a tendency for the values to be higher in patients with "liver coma," there was no close correlation between the depth of stupor and the concentration of ammonia in the blood. The paper serves to draw attention to the low tolerance of patients with liver disease for ammonia and to the dangers of administering ammonium chloride, diammonium citrate, and ammonium cation exchange resins to such patients.

KAPLAN, Bethesda, Md.

RETROPERITONEAL AIR INSUFFLATION FOR THE STUDY OF ABDOMINAL TUMORS IN INFANTS. F. DE VEGA GOICOCCHEA, L. GUBERN SALISACHS, and A. ARNAU GROS, Arch. pediat., Barcelona **5**:221 (Sept.-Oct.) 1954.

This is an explanation of the technique and diagnostic uses of retroperitoneal air insufflation in infants. There are numerous illustrations for the brief résumés of seven cases.

The visualization of kidneys is especially good in children under 6 years of age. The locating of the tumor helps the surgeon determine the best route for surgical intervention. The only contraindication would seem to be those cases in which the tumor has grown beyond the capsule of the organ.

ALLEN, Santa Fe, N. Mex.

INTESTINAL OBSTRUCTION BY DUODENAL DIAPHRAGM. A. F. FERGUSON and N. J. ROTHFIELD, Great Ormond St. J. (No. 3) pp. 105-112, Winter, 1954-1955.

Attention is drawn to a rare cause of intermittent duodenal obstruction, namely, occlusion of the lumen by a congenital diaphragm with a comparatively small opening.

Two cases of incomplete duodenal obstruction are reported, one in a girl aged 7½ years and the other in a 13-month-old girl. The authors emphasize the features which may aid in recognition at the time of the operation and stress the importance of recognizing the existence of this condition.

MCGUIGAN, Evanston, Ill.

AN UNUSUAL CASE OF DUODENAL ULCER IN A YOUNG BOY WITH ACHLORHYDRIA. R. C. HOWLAND, South African M. J. **29**:457-458 (May 14) 1955.

The study is presented of a case of duodenal ulcer associated with persistent histamine-fast achlorhydria in a 14-year-old boy.

The diagnosis depended on the clinical history and radiological findings. Test meals and x-rays were carried out to substantiate this diagnosis.

MCGUIGAN, Evanston, Ill.

THE ANTISPASTIC ACTION OF SODIUM ASCORBATE. A. ZANINI, Minerva pediat. **7**:157 (Feb. 10) 1955.

Sodium ascorbate given by mouth has been recognized as having a laxative action. In the present clinical study, sodium ascorbate (0.5 gm.) was used in a suppository with cocoa butter. Ten children, 17 months to 2 years of age, with chronic constipation were given one suppository on alternate days. Relief of the spasm and constipation was in short order and permanent.

HIGGINS, Boston.

CONSTIPATION AND DIET IN INFANTS. VALERO PEREZ CHALIZ, Acta pediat. españ. **12**:449-466 (May) 1954.

The author expresses surprise at the large numbers of mothers who complain that their babies are constipated, when in his experience diarrhea was more prevalent and serious in his pediatric clinics. He feels that physicians should be very careful in their histories to discover whether there is a transitory constipation due to poor dietary habits or a habitual difficulty due to functional or organic causes. He classifies causes and discusses diagnosis, pathology, etiology, and treatment of various kinds, but with all of the various organic and functional causes reminds the physicians that they should inquire into the diet, as many of the babies aren't fed enough to need daily evacuations.

The anxious mother may be worried about constipation or poor appetite and in many cases needs treatment for her anxiety.

ALLEN, Santa Fe, N. Mex.

TREATMENT OF INFANTILE DIARRHEAS WITH COMBINED PENICILLIN AND STREPTOMYCIN. A. MONTERO RODRIGUEZ, Acta pediat. españ. **12**:1190-1197 (Dec.) 1954.

The author reviews 10 case histories of a total of 50 infants who had been treated with combined penicillin and streptomycin. Many of these children in whom this treatment was used also had ear infections.

The improvement was dramatic, but the author reminds his readers that unless proper diet and nutrition followed the recovery, the child could not be expected to develop properly, and other attacks may well follow. There is the need to eliminate all unhygienic conditions also if recurrences are not to continue to be frequent.

ALLEN, Santa Fe, N. Mex.

OMPHALOCELE. GARRIDO LESTACHE, Acta pediat españ. **13**:48-51 (Jan.) 1955.

The author presents photographs of three different tumor masses of the umbilicus and points out that the most important diagnostic point is to determine what organs or structures are involved in the mass. This will determine the type of surgical intervention or whether any procedure is necessary, as in the case of some masses which are simple hernia.

ALLEN, Santa Fe, N. Mex.

BIOPSY BY LIVER PUNCTURE. P. COZAL, Rev. españ. pediat. **10**:777-784 (Nov.-Dec.) 1954.

The author describes his technique for diagnostic liver puncture. He outlines the indications and contraindications for this procedure.

ALLEN, Santa Fe, N. Mex.

HIRSCHSPRUNG'S DISEASE. M. BODIAN, Monatsschr. Kinderh. **103**:135-137 (Feb.) 1955.

After macroscopic organic lesions have been ruled out, megacolon in children can be divided into two groups: (1) Hirschsprung's disease; (2) idiopathic or atonic megacolon.

Hirschsprung's disease is a congenital malformation consisting of ganglionic aplasia of the distal colonic wall. Treatment is surgical and consists of resection of the ganglion-free portion of the colon.

Idiopathic or atonic megacolon is an acquired disease without structural changes in the wall of the colon. Prognosis is good and treatment conservative.

HARTENSTEIN, Syracuse, N. Y.

A RARE CASE OF SUDDEN DEATH IN THE NEWBORN. P. GILLET and R. PARMENTIER, Acta pædiat. belg. **8**:355, 1954.

A 3-day-old infant, well until the time of writing and following a normal delivery, suddenly turned pale and went into shock. It died shortly after admission to the hospital. Autopsy revealed

hematoperitoneum, originating from a cyst-like swelling on the liver. The microscopic examination showed the "cyst" to be limited by Glisson's capsule and liver parenchyma.

The authors explain the hemorrhage on the basis of trauma to the liver during birth, causing fine petechial hemorrhages. Even minor manipulation of the infant can then cause rupture of the cyst (third day) and continuation of the hemorrhage, leading to shock and death. In the differential diagnosis, interventricular hemorrhage, adrenal hemorrhage, erythroblastosis, and septicemia are to be considered. Treatment, which can be successful only if the hemorrhage has occurred on an accessible part of the liver, consists of transfusion and laparotomy.

GLASER, Baltimore.

CHEMOTHERAPY IN INFANTILE DIARRHOEA: A TRIAL IN ONE HUNDRED SEVENTY-THREE INFANTS. S. T. WINTER, D. LEVI, S. ECKHAUS, and H. V. MUHSAM, Acta pædiat. **43**:459 (Sept.) 1954.

A controlled trial of penicillin, sulfadiazine, streptomycin, chloramphenicol, and Aureomycin was carried out in 173 infants with infantile diarrhea, the majority of whom were malnourished. None of these drugs had a clear-cut effect on the course of the illness as judged by the duration of the diarrhea.

FROM THE AUTHORS' SUMMARY.

DIAPHRAGMATIC HERNIA INTO THE PERICARDIUM. GERGERS THOMPSEN, JORGEN VESTERDAL, and CARL C. WINKEL SMITH, Acta pædiat. **43**:485 (Sept.) 1954.

An account is given of a 6-week-old boy with a diaphragmatic hernia through the foramen of Morgagni, lying within the pericardial sac. An operation by the abdominal route was performed at the age of 7 weeks. After this an enormous pneumopericardium developed, and the hernia recurred. A new operation by the thoracoabdominal route was performed at the age of 3 months, with good results. A review of the previously reported 10 cases is given.

FROM THE AUTHORS' SUMMARY.

Nervous Diseases

THE USE OF PHENYLPROPYL ALLOPHANATE (AC 148) IN THE TREATMENT OF EPILEPSY. SAMUEL LIVINGSTON, J. Pediat. **46**:394-397 (April) 1955.

The results of this preliminary study indicate that this drug may be a valuable addition to the list of drugs now available for the treatment of epilepsies, particularly those convulsant disorders that are associated with a definite organic cerebral disorder—congenital or acquired. In this study the drug was much less effective in cases of idiopathic epilepsy.

Livingston gave this drug to 64 epileptic patients, mostly children. All of these patients had been refractory to maximum doses of other anticonvulsants. There were no irreversible side-reactions.

MACDONALD, Pittsburgh.

THE NORMAL INTERPEDICULATE SPACE IN THE SPINES OF INFANTS AND CHILDREN. WAYNE A. SIMRIL and DONALD THURSTON, Radiology **64**:340-347, 1955.

The authors, following the method of the original charts of Elsberg and Dyke in adults, have measured the interpediculate space in 40 infants 1 day to 2 months of age, 75 infants 2 months to 2 years of age, and 100 children from 2 to 12 years of age. These were presented in this manner as they represented three class groups. A composite graph of normal interpediculate measurements for all age groups is also presented. Each chart shows the normal, maximum, and minimum space for each age group of the thoracic and lumbar spine. It was found that measurements of the cervical vertebrae could not usually be made because of inadequate visualization. Three cases of spinal cord tumor illustrating the use of the curves are included.

ANSPACH, Riverside, Ill.

ATTITUDINAL REFLEXES IN THE NEWBORN. S. FERRER PI, Arch. pediat., Barcelona **5**:115-128 (Sept.-Oct.) 1954.

This is a very interesting study of the reflexes in the newborn in which infants show an involuntary assumption of the erect position and the motions of walking when they are held in an upright position. The examiner holds the baby around the chest just firmly enough to prevent

falls. The legs and thighs straighten, and if there is the stimulus of the plantar surface to the solid table, the infant goes through the motions of walking.

This reflex is present within a few hours of birth and has usually completely disappeared by the fifth month, at which time the baby will flex his knees and draw his legs upward. These reflexes are not to be confused with the voluntary straightening of the lower extremities found in babies after the eighth month, preparatory to walking. At this time the movements are voluntary, and the upper part of the body takes part in the movements also. In the neonate the arms trail limply, taking no part in the reflex movements.

This series of neonatal reflexes were first described by André Thomas, and the author confirms his findings in a large series of cases. The conclusions are as follows: 1. The attitudinal reflexes of straightening of the lower extremities and going through the motions of walking are present in most infants within a few hours of birth. 2. These reflexes do not disappear during the neonatal period unless some other pathological condition occurs. 3. Should there be a negative reaction during the first day, it will usually become positive on the second or third day. In a few cases it may be delayed as long as a week. 4. This reflex occurs in normal newborn infants regardless of birth weight and duration of labor. 5. It would appear to be a sign of an intact nervous system, and the failure to appear would indicate some simple injury at birth which was not recognized and which temporarily inhibits the reflex.

The author found a high percentage of negative results in infants with demonstrable fetal anoxia and after long labor lasting more than 24 hours in the case of a child weighing more than 3500 gm. These two circumstances, long labor and overweight infant, are factors in shock in the newborn.

The author includes pictures showing the way to elicit these reflexes. While he says he will not commit himself positively, he reports several cases of delayed positive reflexes concurrent with infection and/or asphyxia. While a positive reaction may not insure complete integrity of the nervous system, a negative one means at least a transitory disturbance in the physiology of the nervous system.

ALLEN, Santa Fe, N. Mex.

SIMPLE CRANIAL RADIOGRAPHS AND ENCEPHALOGRAPHY IN THE STUDY OF CONGENITAL ENCEPHALOPATHIES. A. BALLABRIGA, Arch. pediat., Barcelona **5**:173-202 (Sept.-Oct.) 1954.

The author gives a very complete description of the types of congenital lesions in the head which can be diagnosed by simple flat plate and those in which EEG and air encephalogram are indicated.

Shape of the head, bony changes, hyperostosis frontalis interna, signs of endocranial hypertension, and intracranial calcified areas may be determined by a flat plate. These are not disease entities but rather findings which should point to the next procedure.

The author then takes up the definite nosological entities which may show one or more of the above signs.

The detailed method of air encephalogram is discussed, with many illustrations of position of the child and other technical points. The details of ventriculography are next discussed. With ventriculography three types of images may be recognized: (1) images which correspond to more or less isolated intraventricular processes; (2) those corresponding to formations of the arachnoidal symphysis, and (3) atrophic processes of the cerebrum. Each of the subdivisions is described as to diagnostic significance, with illustrations.

Last there is a protocol of 32 cases in which air encephalograms or ventriculograms and electroencephalograms were used, with tabulation of the neurological syndrome and results of the procedures in each case. Certain items of history, such as type of labor, history of family defects, and history of convulsive seizures, are also included in this protocol.

ALLEN, Santa Fe, N. Mex.

THERAPY FOR EPILEPSY. J. L. FERRER BOIRA, Arch. pediat., Barcelona **5**:203-220 (Sept.-Oct.) 1954.

The author discusses the various forms of epilepsy and their treatment. It is much more important that treatment be directed toward the prevention of seizures with all phases of therapy than for treatment of attacks. Treatment is directed toward reduction of the convulsive tendency and toward better psychosomatic and social adjustment. Both are of equal importance.

In reducing the aptitude toward convulsive seizures modification of the acid-base equilibrium in the blood is important. The mild acidosis may be achieved by diet or medication. Dehydration of the neurons is achieved by acidosis, salt-free diet, diuretics, and laxatives.

Vasodilators and spasmolytics may be used to reduce the encephalic spasms.

Special anticonvulsive medication depending on specific individual will raise the threshold of neuronal discharge, thus preventing convulsions.

Each case should be studied carefully and specific drug therapy instituted depending on clinical and EEG findings. The author gives the outline from Lennox on the use of drugs for specific types of convulsive seizures and devotes some time to a discussion of the newer drugs.

ALLEN, Santa Fe, N. Mex.

VENTRICULOMASTOIDOSTOMY IN THE TREATMENT OF HYDROCEPHALY. JUAN PICANOL, Acta pediat. españ. **12**:1134-43 (Dec.) 1954.

The author describes the various forms of hydrocephaly and gives the details of the Ventriculomastoidostomy operation using a polyethylene catheter between the two cavities, the ventricle and the antrum of the mastoid. He presents four case histories with ample illustrations. Two were successful, the others died after going home following the operation. One he believed died due to hypotension, but the child was not seen at autopsy.

ALLEN, Santa Fe, N. Mex.

Psychology and Psychiatry

ROENTGENOGRAPHIC DIAGNOSIS OF GEOPHAGIA. R. S. CLAYTON and PAUL H. GOODMAN, Am. J. Roentgenol. **73**:203-207 (Feb.) 1955.

This article is reportedly the first report on the roentgen diagnosis of geophagia, or "dirt-eating." The diagnosis may be suspected whenever there is an unexplained increase in radiopacity of fecal content of the colon. The term "pica" has been applied to this finding by some authors. The authors' cases were in three Negro women, and apparently the finding is not uncommon in pregnancy and has been reported from all portions of the world. The occurrence of this in children has also been recorded.

ALTMAN, Miami, Fla.

CLINICAL TREATMENT OF APHASIA. HILDRED SCHUELL, VIRGINIA CARROLL, and BARBARA STANSELL STREET, J. Speech & Hearing Disorders **20**:43-54 (March) 1955.

All aphasic patients are impaired in auditory retention and recall. In addition, specific sensorimotor involvement, or specific visual involvement may coexist as complicating factors. Treatment for the individual patient is determined by the kinds of impairment which are present. Auditory stimulation is essential for all aphasic patients. A technique of treatment is described.

PALMER, Wichita, Kan.

PSYCHIATRIC EVALUATION OF TREATED CASES OF TUBERCULOUS MENINGITIS. V. DELCLOS, Arch. pediat., Barcelona **5**:25-27 (July-Aug.) 1954.

The author presents a study on the changes which took place in 40 children following treatment for tuberculous meningitis in 1950. Fully 50% of the cases showed regression from the level of intelligence they had previous to the appearance of the tuberculous process. At that time there was a question in her mind as to whether the regression resulted from the infectious process or from the treatment or both.

In this article she presents two groups of children. One group had long periods of treatment with streptomycin. The other group was treated early with isoniazid with only a very brief amount of streptomycin following isoniazid.

Her conclusions are (1) the children treated with isoniazid showed little regression in their intellectual processes, taking into consideration tests of various kinds before and after treatment. The group of children treated with adequate streptomycin over a long period of time showed psychological changes, with most showing a definite mental deficit. However, these children did not show as serious loss as the group reported by this author in 1940.

ALLEN, Santa Fe, N. Mex.

PSYCHOGENIC WEEPING IN INFANCY. JESUS MARTINEZ FERNANDEZ, Acta pediát. españ. **12**:707-719 (Aug.) 1954.

The author compares the crying of a normal child with those who have some abnormality in personality development. Since the author has written a book on the subject, he does not propose to give extensive coverage but to point out facts which will help pediatricians to understand their young patients.

The first cries are purely reflex and do not take on any willfulness until later. The psychic intention or design develops in the second or third month, but the quality of volition is not apparent until nine months to one year.

The crying of the older child is much more significant, and the author discusses fear and anger and the use of crying as a safety valve. He also discusses the origin of fear in the newborn and its possible relation to later anxiety. He distinguishes between the physical changes and the cries brought on by fear from those resulting from anger in the small child. He discusses the fears characteristic at the various age levels. The relation between nocturnal fear and enuresis is discussed.

By 2 years of age a child is able to cry from sympathy or compassion, as exemplified by crying when he sees his mother cry. By 3 years he cries when he sees an animal mistreated.

The author discusses the differences in the indulged child and in the little stoic. The problems of jealousy are described.

He also discusses the bad effects of trying to stop crying under certain conditions and describes the calm silent sympathetic adult who does not threaten to punish or laugh and make jokes about the child's crying.

He ends by quoting Adler concerning the harmful effects of too rigid education.

ALLEN, Santa Fe, N. Mex.

SOME IDEAS FOR THE DEVELOPMENT OF INSTITUTIONS FOR THE ASSISTANCE OF ABANDONED INFANTS. E. JASO and J. M. ARGOTE, Rev. españ. pediat. **10**:785-789 (Nov.-Dec.) 1954.

The authors, who are a doctor and an architect, outline plans for (1) the care of infants; (2) the care of infants and mother who are abandoned by the father. The physical and emotional improvement of the mother and child with gradual integration into society is the purpose. Nurses well trained in instruction and an atmosphere of helpfulness rather than a punitive one should be maintained.

Cuts showing architectural details are included.

ALLEN, Santa Fe, N. Mex.

PSYCHIATRIC ASPECTS OF ENCEPHALOPATHIES IN CHILDREN. G. HENYER, Rev. españ. pediat. **11**:35-47 (Jan.-Feb.) 1955.

After discussing the various encephalopathies which do not totally disable the child and classifying the various forms of cerebral palsy, the author describes how the work with children must be a team approach. There must be patient, close cooperation between orthopedist, psychologist, neurologist, speech therapist, physical therapist, etc. The psychotherapy should be directed at getting the parents to accept the child and to allow maturation. Children put in institutions show marked regression in the same manner as that described by Rene Spitz among children without encephalopathies.

ALLEN, Santa Fe, N. Mex.

Diseases of Genitourinary Tract

MICTURATING CYSTO-URETHROGRAPHY IN THE INVESTIGATION OF ENURESIS. O. D. FISHER and W. I. FORSYTHE, Arch. Dis. Childhood **29**:460 (Oct.) 1954.

One hundred and thirty-five children with persistent enuresis were investigated by micturating cystourethrography.

In 43 boys and 31 girls the enuresis was considered to be of functional origin.

In 41 boys and 20 girls this procedure revealed abnormalities of the urinary tract. These included valves of the posterior urethra (25), neurogenic disorders of the bladder (12), wide bladder-neck anomaly (14), small-capacity bladder (4), meatal stenosis (2), urethral reflux (2), stenosis of the membranous urethra (1), and congenital hypertrophy of the vesical neck (1).

The symptoms and signs of the organic disorders did not distinguish them from the functional enuretics.

The radiological technique is simple enough to be undertaken in any radiographic department, and it causes no more disturbance to the child than catheterization.

KELLY, Milwaukee.

UNDESCENDED TESTIS. J. H. LOUW, South African M. J. **28**:807-811 (Sept. 18) 1954.

The author feels that the only logical approach to the problem of undescended testis is surgical. He suggests that most hormonal cures are found only in the so-called retractile testis, and that they are best used to hold the testis in the scrotum following surgery. He feels that surgery is best performed at about five years, since spermatogenesis begins to deteriorate soon after that age.

MCGUIGAN, Evanston, Ill.

A METHOD OF EXCRETORY UROGRAPHY IN CHILDREN. P. J. DENNEHY, South African M. J. **28**:949-952 (Nov. 6) 1954.

The author mentions a new technique for improving the excretion urogram in children. He suggests the use of a carbonated beverage to fill the stomach with air and displace the intestinal loops downward, thus giving a clear view of the kidney through the gas-filled stomach. This method has been used for some time in this country.

MCGUIGAN, Evanston, Ill.

RENAL FUNCTION TESTS IN CHILDREN, ESPECIALLY THE SODIUM THIOSULFATE AND THE PARA-AMINOHIPPURIC ACID CLEARANCES. C. CIPOLLONI and A. PACI, Minerva pediat. **6**:696 (Sept. 15) 1954.

The author used sodium thiosulfate and paraaminohippuric acid clearances and concentration and dilution tests in evaluating the kidney function of 32 normal children, 3½ to 12 years of age. Taking into consideration the body surface, the results with these tests were similar to those found in adults.

HIGGINS, Boston.

TESTICULAR ADENOCARCINOMA (EMBRYONIC) IN A BOY TWO YEARS OF AGE. ALFONSO DE LA PEÑA, Acta pediat. españ. **12**:354 (April) 1954.

The author discusses the case of a boy 2 years of age who had an adenocarcinoma, embryonic in origin. Clinically there appeared to be only a hydrocele with unilateral cryptorchidism. The early age and malignancy are unusual.

ALLEN, Santa Fe, N. Mex.

Cutaneous Diseases; Allergy

TREATMENT OF INFECTIOUS ASTHMA AND RESPIRATORY INFECTIONS WITH ACELLULAR BACTERIAL ANTIGEN COMPLEX. AARON D. SPIELMAN, New York J. Med. **55**:1603 (June 1) 1955.

Spielman reports his work in the allergy clinic of the Beekman-Downtown Hospital, New York. He says that the advisable use of the antibiotics has greatly detracted from the study of antigens and has prevented immune body production, thus making desensitization difficult. In the making of vaccines many desirable elements are lost; therefore a vaccine may be lacking in important antigenic components. Experimental work with Hoffman's acellular bacterial vaccine complex has proved its value because it does contain antigenic agents missing in many preparations. Results have been very good in about 80% of the cases. No undesirable side-effects have been noticed, and there has been no need for antibiotics. "Treatment with bacterial antigen complex preparations should be accompanied by simultaneous treatment of all non-bacterial allergies and attention to all medical needs of the patient." There are two illustrative detailed case reports, four tables, and 12 references to the literature.

I. W. VOORHEES, New York [A. M. A. ARCH. OTOLARYNG.].

ROCH'S LIPOMATOSIS IN TWO UNIVITELLINE TWIN SISTERS. H. BENARD, A. GAJDOS, and H. PEQUIGNOT, Presse méd., Supp. 28, p. 579, April 17, 1954.

History is given in two univitelline twin sisters, both presenting the type of "discrete lipomatosis" as described by Roch in 1908. Its congenital and familial features have also been pointed out by other authors.

In the present two cases, the appearance, location, and development of the condition were in all respects identical.

Both sisters agree that their paternal grandmother had shown the presence of one lipoma at least on the internal aspect of her left forearm.

Diagnostic discrimination should be made from Recklinghausen's disease, multiple cutaneous carcinomas, multiple cysts, and Launis and Bensaude's adenolipomatosis.

Incidence of Roch's lipomatosis may be higher than thought because the nodules, as a rule, do not promote any functional disturbance and remain often ignored.

FROM THE AUTHORS' SUMMARY.

CONGENITAL DERMATITIS HERPETIFORMIS DUHRING. A. WERNER, Ann. pædiat. **182**:176 (March) 1954.

A type of congenital dermatosis is described which substantially showed the symptoms and signs of dermatosis herpetiformis Duhring, but the further course of the disease was unusual inasmuch as in all the six cases known in the literature, after about six to eight weeks, instead of the healed blebs peculiar hyperkeratosis appeared in characteristic distribution and also disappeared again, sometimes leaving in their wake scarring and pigmentation. After several months there are practically no changes of the skin left. After detailed description of the rare clinical picture and consideration of the differential diagnosis the question is discussed whether we are really dealing with a herpetiformis dermatitis or with a clinical entity so far unclassified.

FROM THE AUTHOR'S SUMMARY.

A CASE OF EHLERS-DANLOS SYNDROME. G. BERNARDI and P. CAGINI, Clin. pediat. **36**:657 (Sept.) 1954.

A 9-year-old boy presented the findings of cutis laxa with pigmentation of scars in areas of loose skin, especially at the knee joints; he also had hypertrichosis and hypoevolution of the genitalia. A very scanty secretion of the adrenal cortical hormones was found in the urine. There was no familial history of similar pathological lesions or of syphilis; the boy's Wassermann test was negative. The opinion is expressed that an endocrine dyscrasia was the basis of the boy's condition.

HIGGINS, Boston.

SIX CASES OF KAPOSI'S VARICELLIFORM ERUPTION. M. MALOSSI, Clin. pediat. **36**:707 (Sept.) 1954.

Six infants, 6 to 17 months of age, developed pustular lesions over the face and body and high fever; one of the children developed a keratitis with a corneal ulcer. Electroencephalograms indicated a diffuse cerebral involvement. Each child had had a history of previous eczematous lesions, but a virus infection seemed to be the most likely cause of the condition. Herpes simplex and multiple vaccinia could be definitely ruled out. Various antibiotics were tried, but without therapeutic benefit. The duration of the illness was about two to three weeks. The cases seemed to fall into the category of Kaposi's varicelliform eruption.

HIGGINS, Boston.

TWO CASES OF GENERALIZED SCLERODERMA IN CHILDREN. ADALBERTO STEEGER, AMANDA FRITIS, and J. DANERO NOVOA, Rev. chilena pediat. **25**:20 (Jan.) 1954.

The authors report on two cases of generalized scleroderma in children aged 4 and 6 years. In the first case, who had no visceral lesions, the skin manifestations regressed spontaneously, while the second case, with muscular, osseous, and visceral involvement, is still under treatment with corticotropin (ACTH) after receiving 1.50 grains (0.1 gm.) of cortisone.

FROM THE AUTHORS' SUMMARY.

A CONTRIBUTION TO THE PATHOGENESIS AND THERAPY OF COLD URTICARIA. H. KOLBL and H. G. WOLF, Deutsche med. Wchnschr. **79**:1833 (Dec. 3) 1954.

A boy about 11 years of age suffered for two years from strongly itching urticarial efflorescences of the skin on exposure to cold, disappearing on warming. Immersion of hands and forearms in cold water produced the same effect on rewarming. Serum taken at the time of exposure to cold was used for Prausnitz-Kustner test, which gave a positive reaction on applica-

tion of ice or injection of a cooled saline solution. It is of interest that the reaction was more intense when the blood was taken from the obstructed arm vein. In this case a cold allergy existed. Another boy about 13 years of age had his first attack of urticaria 10 years previously on returning from a sleigh ride to a warm room. Since then longer exposure to cold air elicited attacks which disappeared on warming for some time. This boy had definite signs of vasomotor hyperirritability. The Prausnitz-Kustner test was repeatedly negative. The diagnosis in this case was vasoneurotic cold urticaria without evidence of an allergic genesis. Both cases responded to antihistaminic therapy, which could also prevent the urticaria when taken before exposure to cold. Furthermore, autodesensitization by graded exposure to cold was recommended.

AMBERG, Rochester, Minn.

Miscellaneous

PREVENTION OF CHILDHOOD ACCIDENTS—WHAT ARE WE WAITING FOR? HARRY F. DIETRICH, J. A. M. A. **156**:929-931, 1954.

Accidents kill one-third of the children who die each year. Between 11,000 and 13,000 children are being killed each year, and 40,000 to 50,000 are permanently injured annually. To date nothing is being done about this.

KIMBALL, Evanston, Ill.

PHONETIC EQUIPMENT OF SPASTIC AND ATHETOID CHILDREN. ORVIS C. IRWIN, J. Speech & Hearing Disorders **20**:54-57 (March) 1955.

The phoneme content of the speech of 266 cerebral palsied children from 1 to 12 years of age was analyzed. Included in this group were 128 spastics, 86 athetoids, and 52 tension athetoids. On the basis of the four criterion measures—vowel type, consonant type, vowel frequency, and consonant frequency—there was no strong statistical evidence of difference between spastics, athetoids, or tension athetoids. There was a significant increase in mastery of speech sounds with age.

PALMER, Wichita, Kan.

CHOKING ACCIDENTS. LAWRENCE R. BOIES, Minnesota Med. **38**:235 (April) 1955.

Choking accidents in children are common and can be avoided in many cases. Children should be quiet and calm at eating time. Nuts, popcorn, firm pieces of fruit, and fruits containing large seeds should not be fed to children. The play area should be kept free of objects which are likely to be placed in the mouth. In the rural areas grain and shelled corn are added hazards.

STOESSER, Minneapolis.

INTRAUTERINE DEATH OF THE FETUS DUE TO ACCIDENTAL CARBON MONOXIDE POISONING. GULLI LINDH MULLER and SYLVIA GRAHAM, New England J. Med. **252**:1075 (June 23) 1955.

A case of intrauterine death of a full-term female fetus due to asphyxia caused by accidental, long continued, nonfatal carbon monoxide poisoning of the mother is reported.

The typical cherry-red color of skin and organs of the fetus was present, and fetal blood was 49% saturated with carboxyhemoglobin.

It seems quite clear that carbon monoxide is transferred to the fetal blood by passage through the placental villi like other gases and nutrients and may cause the death of the fetus.

Possible mechanisms for the behavior of this gas in the combined circulations and tissues are delineated, and 23 cases of a similar nature are reviewed from the literature.

WHEELOCK, Washington, D. C.

A METHOD OF BLUNTING THE TIPS OF SMALL INDWELLING NASOGASTRIC POLYETHYLENE CATHETERS FOR FEEDING PREMATURE INFANTS. WILLIAM A. SILVERMAN, Pediatrics **14**:267 (Sept.) 1954.

A simple method of blunting the tip of a minute polyethylene catheter has been described to make the tube suitable as an indwelling nasogastric tube for feeding premature infants.

FROM THE AUTHOR'S SUMMARY.

RENAL AND VASCULAR DISTURBANCES IN A CASE OF THALLIUM POISONING. S. T. WINTER, Z. LARON, and I. C. MICHAELSON, Arch. Dis. Childhood **29**:443 (Oct.) 1954.

A boy aged 9 years suffering from thallium poisoning showed marked hypertension, renal dysfunction, and retinal vasoconstriction, as well as the more usual clinical features of this intoxication.

All the manifestations, with the exception of retinal vascular constriction, cleared without the use of dimercaprol (BAL). Trial doses of hexamethonium bromide produced a marked temporary fall of the blood pressure.

The etiology of the hypertension and renal damage is discussed, and the analogy with lead poisoning is drawn. It is considered likely that the thallium brings about hypertension by a direct action on the blood vessels.

KELLY, Milwaukee.

SOME SOCIAL ASPECTS OF PEDIATRICS. H. T. PHILLIPS and EVA J. SALBER, South African M. J. **29**:400-503 (May 21) 1955.

In a great many countries the state is assuming more responsibility for the care of the expectant mother and for increasing her efficiency in the rearing of children.

In model native townships in South Africa the Health Center Program for child health begins in pregnancy, and continued care is given to the mother along with special training regarding child health.

The authors feel that in the practice of pediatrics it is important to remember that the ultimate responsibility for the care of children rests in the hands of the parents, and all efforts therefore are made to encourage families to use their own resources to maintain their health and assist in the care of their sick. Education for health, however, is not the work of any one agency. All health works, and especially the family doctor, have opportunities to promote the health of the children because of their close relationship to the families and to the communities.

MCGUIGAN, Evanston, Ill.

THE ACTION OF ACTH GIVEN INTRADERMALLY. E. BOTTONE, Minerva pediat. **6**:657 (Aug. 31) 1954.

The author found that the giving of ACTH intradermally to hypophysectomized rats led to the same physiological results as when it was given intramuscularly.

HIGGINS, Boston.

LIFE-ENDANGERING MELENA IN AN INFANT WITH A SEVERE BURN: A CONTRIBUTION TO PATHOGENESIS AND THERAPY. WOLF WITTELS, Wien. klin. Wchnschr. **67**:418-420 (June 10) 1955.

An 18-month-old very adipose boy was severely burned with hot water. From the third day the stools showed evidence of intestinal bleeding, and once coffee-ground-like material was vomited. The treatment resulted in recovery. This was the only one of 37 cases, mostly infants, surviving who presented a melena after burns.

AMBERG, Rochester, Minn.

THE EXTRACELLULAR FLUID VOLUME IN INFANTS AND CHILDREN. BENT FRIIS-HANSEN, Acta pædiat. **43**:444 (Sept.) 1954.

The extracellular volume in 50 infants and children has been studied by a micromodification of the thiosulfate method. This technique was first tried out, and it was found that determinations carried out on capillary blood gave the most consistent results. Some limitations of the method are discussed.

The extracellular volume was found to diminish rapidly during the first six months of life, from 44% to 30% of body weight, later a gradual decrease during childhood ensued, from 30% to 20% around puberty. When expressed as liters per square meter of surface area of the body a less pronounced fall was observed and only during the first month of life.

FROM THE AUTHOR'S SUMMARY.

CONVULSIONS DURING ACTH AND CORTISONE TREATMENT. D. J. VAN ZAANE Maandschr. kindergeneesk. **22**:210-216 (June) 1954.

A 7-year-old girl suffering from rheumatic fever responded with convulsions during treatment with ACTH. There was no hypertension, signs of cerebral edema, or abnormalities in electrolyte balance. A direct action of ACTH seems to be the cause in many of the reported instances in which convulsions occur during ACTH and cortisone treatment.

Regular control of the EEG is recommended during prolonged ACTH or cortisone treatment.

VAN CREVELD, Amsterdam.

INTOXICATION BY THE USE OF ORGANIC PHOSPHATIC COMPOUNDS FOR SPRAYING PURPOSES. J. C. GUNST and J. C. H. M. WIJFFELS, Nederl. tijdschr. Geneesk. **98**:3226 (Nov. 6) 1954.

There is an increased use of organic phosphatic compounds in agriculture and industry. During wartime these substances can be used as poison gas. The pharmacological action is a blocking of the cholinesterase system with subsequent accumulation of the amount of acetylcholine in the body. Description is given of a 3-year-old boy with an intoxication by dermal contact with TAPP.—such an organic phosphatic compound—treated with 4 mg. of atropine.

VAN CREVELD, Amsterdam.

News and Comment

GENERAL NEWS

Specialists Certified by The American Board of Pediatrics, Inc.—The following physicians were certified by The American Board of Pediatrics, Inc., in Chicago on Oct. 7, 8, and 9, 1955.

Adler, Sidney Jacson, Anaheim, Calif.
Anderson, Thomas Ault, Isle of Palms, S. C.
Austin, Ona Mae Ricketts, Irving, Texas.
Ball, Harold C., Hayward, Calif.
Bennett, Edith Muriel, Kentfield, Calif.
Berlow, Stanley, Milwaukee.
Bevis, William David, Minneapolis.
Billmeyer, Daniel Kenneth, Oregon City, Ore.
Caddy, James A., Levittown, N. Y.
Coren, Flossie, Detroit.
Colle, Eleanor, Minneapolis.
Corneal, Forrest Bruce, Harrisburg, Pa.
Crose, Robert Franklin, Yakima, Wash.
Curry, Vernell W., Pueblo, Colo.
Dannenbring, Forrest G., Fort Dodge, Iowa.
Derlow, Jack Herman, Tucson, Ariz.
Deshler, Gordon L., Alliance, Ohio.
Donahoe, James Louis, Columbus, Ga.
Doyle, Patrick J., Van Nuys, Calif.
Elegant, Lawrence David, Chicago.
Elghammer, Richard Mason, St. Joseph, Mich.
Erickson, Laurence Frederick, Minneapolis.
Fisher, William Augustus, Creston, Iowa.
Fishler, James Stuart, Poughkeepsie, N. Y.
Frid, James Gordon, Peterborough, Ont., Can.
Gold, Eli, Cleveland Heights, Ohio.
Grossman, Burton J., Chicago.
Gundell, Kurt M., Whittier, Calif.
Hinman, Alanson, Winston-Salem, N. C.
Hough, Jerald P., New York.
Hult, John Edward, Cloquet, Minn.
Hurst, Peter L., Beaverton, Ore.
Katona, Nicholas Martin, Cincinnati.
Kaufman, Barbara H., Cleveland.
Kerr, John Keith, Mesa, Ariz.
Kiyasu, William Sadao, Oakland, Calif.
Knoblock, Dolores E., Chicago.
Kulczycki, Lucas L., Boston.
Laing, Clarence R., Cleveland.
Leslie, Hugh J., Jr., Cleveland.
Lieb, Francis X., St. Louis.
Loeffler, John George, Jr., Carlisle, Pa.
Lukens, Abbie Ruth, Chicago.
McGee, Donald H., Wilmington, Del.
MacKay, James Albert, South Euclid, Ohio.
Marsden, John Hal, Los Angeles.
Mettimore, Joseph M., Columbia, S. C.
Miller, Albert G., St. Paul.
Milnor, John C., Honolulu, T. H.
Mont, Hallie Buchanan, North Holloywood, Calif.
Morgan, James L., Portsmouth, Va.
Morrison, Robert B., Zanesville, Ohio.
Mosse, Carl E., Forest Hills, N. Y.
Myers, Carth G., Salt Lake City.
Nordstrom, Frank Bright, Farmington, N. M.
Pascoe, Delmar Joseph, San Francisco.
Perellis, Maurice Albert, Louisville.
Podolsky, Morton L., Port Arthur, Texas.
Richard, Norman B., Kenmore, N. Y.
Rider, Joan Elvere, Lexington, Ky.
Rosenberg, Harvey Wintner, Beverly Hills, Calif.
Roth, Alexander, Priarie Village, Kan.
Rullan, Mimosa Marin, Santurce, P. R.
Runco, Angelo Samuel, Pittsburgh.
Rutledge, Mary Louise, Charlotte, N. C.
Sayre, James W., New London, Conn.
Schaar, Frances Elizabeth, Minneapolis.
Shapiro, Daniel J., Cleveland.
Sharp, Austin R., Cleveland.
Shulruff, Joseph T., Chicago.
Sisman, Bernard, Monroe, Mich.
Smith, Richard Thomas, Minneapolis.
Snook, William Maurice, Portland, Ore.
Thornton, Mary, Salt Lake City.
Tomsovic, Edward J., Tacoma, Wash.
Verosky, John Michael, El Paso, Texas.
Webster, William Sargent, Hamburg, N. Y.
West, James R., Ancon, C. Z.

Special certificate, noncitizens:
Alikpala, Simona C., Washington, D. C.
Guiang, Sixto, Jr., Pittsburgh.

Books

BOOK REVIEWS

Standard Values in Nutrition and Metabolism, Being the Second Fascicle of a Handbook of Biological Data. Edited by Errett C. Albritton, M.D. Price, $6.50. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5, 1954.

The purpose of this monograph is the tabular or graphic presentation of collected data on nutrition and metabolism. It covers nutrients required by plant as well as animal forms, nutrient values of foods, functions and signs of deficiency and excess, metabolic pathways, and energy exchange.

The material was contributed by more than 800 specialists. Significant references are provided.

The first volume of this series, "Standard Values in Blood," was published in 1952. Others are in progress. These volumes will have comparable value in the biological field to that which the "Critical Tables" have in the field of chemistry and physics. All those dealing with basic research and all scientific libraries should have these volumes available for valuable basic data and reference sources.

Ciba Foundation Colloquia on Endocrinology. Vol. VIII: The Human Adrenal Cortex. Edited by G. E. W. Wolstenholme and Margaret P. Cameron. Price, $10. Pp. 665, with many illustrations. Little, Brown & Company, 34 Beacon St., Boston 6, 1955.

The eighth of a series of "Ciba Foundation Colloquia on Endocrinology," this volume is a verbatim report of the proceedings of two series of meetings devoted to a discussion of the adrenal cortex. As usual in these Ciba colloquia, specific advances in knowledge are formally presented by experts who are actively engaged in investigative work in the field. Following each talk there is an informal group discussion.

In the first series of meetings, attention is focused principally upon histological and biochemical aspects. Methodology is presented. Changes during stress are described. Aldosterone is particularly well reviewed.

The second series of meetings is concerned with adrenal physiology, pathology, and relationship with the pituitary. The evaluation of adrenocortical function is reviewed, the sodium: potassium concentration ratio in the saliva as an indication of adrenocortical function being one of the more unique methods. Very interesting experiments are described wherein the pituitary portal veins are shown not to be of importance in the "nervous" control of anterior pituitary function. Studies of the relationship between the thyroid and adrenal are presented. Of clinical interest are chapters on virilizing adrenal hyperplasia, Cushing's syndrome, and psychological influences on the adrenal.

As a progress report of the current investigation in many of the various aspects of adrenal cortical endocrinology, this book is of great value, particularly to the investigator.

Fibrocystic Disease of the Pancreas. Edited by Martin Bodian. Price, $9.50. Pp. 244, with 121 illustrations. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1953.

The Director of Pathology of London's Hospital for Sick Children, in collaboration with a pediatrician and a geneticist, thoroughly reviews a series of one hundred sixteen cases seen from 1943 through 1950.

Initially, pertinent literature up through 1951 is surveyed. Two points are particularly stressed: the evolution of the concept of the pathogenesis of the disease to the present "mucosis" hypothesis and the evidence for meconium ileus being its earliest clinical form.

The study reveals that although the first major symptom occurs in the neonatal period in 80% of cases and by one year of age in all but one case in the series, 50% of cases are not diagnosed until after one year of age. The clinical picture is reviewed, and the laboratory diag-

nosis is discussed. The latter principally concerns duodenal fluid trypsin levels. That the electrolyte concentration of sweat is not mentioned is to be expected because the series antedated such investigations.

A chapter on familial incidence suggests a recessive gene hypothesis, indicating that the parents of a child with fibrocystic disease of the pancreas stand one chance in four of each further child having the same condition.

The chapter on pathology is very complete and well illustrated. Generalized mucosis is described and demonstrated in photomicrographs. With the recent increase in interest concerning liver changes in this disease, the author's discussion is of particular importance. The mucosis lesion develops in two stages: bile-duct proliferation followed by a specific focal biliary fibrosis. Three-quarters of all autopsied cases reveal this lesion, as did all but one dying over one year of age.

The author concludes that this is a disease of mucous-secreting glands and that as such we should expect the most significant pathology to occur in those organ systems in which mucous glands are the most prominent—the digestive and respiratory systems. He further points out that the greatly increased longevity of cases now being treated with the newer antibiotics will undoubtedly lead to an increase in the importance of the liver lesions.

The one hundred sixteen cases are each briefly presented with autopsy findings included on fifty-five of the sixty-eight patients who died.

Dr. Bodian succeeds in quite vividly demonstrating the pathogenesis of "mucosis." This book is highly recommended to those who seek to understand as much as possible about what is taking place within these unfortunate little ones.

Lehrbuch der Tuberkulose des Kindes und des Jugendlichen. Ed. 2. By Werner Catel. Price, 66 Deutsche marks. Pp. 501, with 147 illustrations. Georg Thieme Verlag, Stuttgart, Herdweg 63, 1954.

This is an exhaustive and up-to-date book on tuberculosis in children and adolescents, based on extensive clinical and experimental studies by the author. There is a complete review of all aspects of tuberculosis, and the material is concisely and clearly presented. There are chapters on anatomy and physiology of the respiratory tract, on immunology, on the influence of constitution and climate. A very informative section deals with the primary complex and its complications. Under the heading "generalization," the author discusses miliary tuberculosis and tuberculosis of the skin, the serous membranes, bones, joints, genitourinary tract, and central nervous system. The following chapter deals with the "tertiary" stage.

An excellent discussion is devoted to the differential diagnosis of enlarged lymph nodes and x-ray findings of lungs, bones, and joints. Next comes a section on active immunization. The author agrees with Wallgren and others that BCG immunization is apparently efficient in preventing miliary tuberculosis of the lungs, pleurisy, and tuberculous meningitis, but he feels that certain aspects of BCG need further clarification: standardization of the culture and duration of immunity.

The final chapters deal with medical and surgical treatment. They are complete and up to date.

The book is highly recommended to all physicians interested in tuberculosis. Paper, print, and illustrations are excellent.

Maternal Emotions. By Niles Newton. Price, $3. Pp. 140. Paul B. Hoeber, Inc., 49 E. 33d St., New York 16, 1955.

This short and readable volume is both stimulating and encouraging, although it is not to be hoped that it will be acceptable to the feelings of all who might read it. It is not until the entire book and the appendices have been read that it becomes obvious that the authoress has made an intense and sincere effort to maintain the utmost objectivity towards her subject although she herself is female and a mother.

The widespread dawning of interest in the emotional aspects of motherhood, infancy, childhood, and adolescence is having a most salutary effect in stimulating and supporting research in these areas. However, most workers in the field of emotional problems are hampered by the difficulty of establishing any sort of proper controls and the hazard of subjecting interview-obtained material to statistical analysis. Dr. Newton, fully recognizing these problems and

admitting that her research method is but a beginning, has made a noteworthy advance towards the introduction of the scientific method into the study of attitudes. Dr. Newton does not term her findings conclusive, but states her studies suggest some "possibilities." Most of these possibilities have been bandied about for years as clinical impressions, aphorisms, and the like, and it is most heartening to see someone attempt to statistically and systematically substantiate or deny them. There is very little that is startlingly new in the findings, but the manner in which the project was approached, the painstaking care to avoid bias in the questions used, the interviewer, and the analysis of answers is of real interest and leaves the feeling that the findings are essentially valid for the particular group of women studied. It will be of further interest if the study is expanded to include mothers of other socioeconomic and racial groups. This small volume should be read by all obstetricians, psychiatrically oriented or not, and it is heartily recommended as thought-provoking material for pediatricians who are, in most instances, the ones who must handle the clinical results of faulty maternal emotions.

The Physician and the Law. By Rowland H. Long. Price, $5.75. Pp. 284. Appleton-Century-Crofts, Inc., 35 W. 32d St., New York 1, 1955.

This book is a short review of the common problems relating to the legal aspects of medical practice. Of particular interest to pediatricians would be the sections on blood-group tests as they relate to disputed paternity, the section on artificial insemination, and the section on adoption procedures.

Feeding Your Child. By Samuel M. Wishik, M.D. Price, $3.50. Pp. 223. Doubleday & Company, Inc., 575 Madison Ave., New York 22, 1955.

Dr. Wishik has written this excellent book because he recognizes what a major concern the feeding of a child is for parents. And if it is important for parents, it is also an important subject for the physicians who advise them.

Dr. Wishik points out that mothers are less familiar with infants and their problems of feeding now than in former years because girls are not as closely associated with the raising of younger siblings or cousins or nieces as they were during the days of larger families and closer family living. He feels that mothers need more information from reading and talking with their physicians to make up for this inexperience in order to get a general feeling of competence in this field. He stresses that mothers are competent and usually will do all right if they trust their instincts and try the "ways that come easily."

This book gives no one way to do things, but gives various suggestions. A particularly good section is that devoted to crying and its analysis in relation to feeding. Dr. Wishik points out that the old bugaboo of overfeeding infants is a myth. He makes no radical suggestions but puts the various aspects of feeding in a balanced perspective. For example, he has nothing against a mother trying to feed her infant semisolid foods early, but he sees no advantage in urging this procedure until the individual baby is dissatisfied with the usual breast feedings or quart of milk mixtures. It is this recognition that infants are human beings and have their own desires and dislikes that makes this a very human book. Not only can it be recommended highly for parents, but it should be widely read by physicians caring for infants and children.

The Lowenfeld Mosaic Test. By Margaret Lowenfeld. Price, 50 shillings. Pp. 349, with 114 illustrations. Newman Neame Ltd., 50 Fitzroy St., London W 1, 1954.

One of the basic problems faced by the author is that of description and delineation of the test. The author accomplishes this in one hundred pages and then attempts to assess the potential of the test. Due to the limited information as yet available, there has been no attempt to fully state the true value of the test. The auhor sees it essentially as a device for the comparison of cultural differences, for the test does not depend upon the education of the testee. Productions on the test have been found to vary from culture to culture. The author suggests that the test may prove quite valuable in the cross cultural study of children as well as in the study of childhood development within a culture.

A new psychological test is always an unknown, and publications on it are rarely of general interest to professional people other than psychologists or psychiatrists. In general, the book appears to be a superior publication in a specific area.

BOOKS RECEIVED

Growth at Adolescence. By J. M. Tanner. Price, $6.50. Pp. 212, with 10 photographs and 57 figures. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1955.

Therapy of Fungus Diseases: An International Symposium. Edited by Thomas H. Sternberg and Victor D. Newcomer. Price, $7.50. Pp. 337, with numerous tables. Little, Brown & Company, 34 Beacon St., Boston 6, 1955.

Klinische Elektrokardiographie. Ed. 3. By M. Holzmann. Price, $19.05. Pp. 688, with 303 illustrations. Georg Thieme Verlag, Stuttgart, Herdweg 63; American agent, Intercontinental Medical Book Corporation, New York 16, 1955.

Introduction to Virology. By Gilbert Dalldorf. Price, $3.50. Pp. 102. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1955.

Psychology in Nursing. By Wendell W. Cruze. Price, $5.50. Pp. 494, with 79 illustrations. McGraw-Hill Book Company, Inc., 330 W. 42d St., New York 36, 1955.

Premature Infants. Ed. 2. By Ethel C. Dunham. Price, $8. Pp. 458, with 41 illustrations. Paul B. Hoeber, Inc., 49 E. 33d St., New York 16, 1955.

Swift and Carroll: A Psychoanalytic Study of Two Lives. By Phyllis Greenacre. Price, $5. Pp. 306, with 6 illustrations. International Universities Press, 227 W. 13th St., New York 11, 1955.

Child Behavior. By Frances L. Ilg and Louise Bates Ames. Price, $3.95. Pp. 364. Harper & Brothers, 49 E. 33d St., New York 16, 1955.

Untersuchung und Beurteilung des Herzkranken. By Prof. Dr. H. W. Knipping, Dox. Dr. W. Bolt, Dr. H. Valentin, and Dr. H. Venrath. Price, 43 marks. Pp. 461, with 265 illustrations. Ferdinand Enke, Hasenbergsteige 3, Stuttgart, W. 1955.

Perinatal Mortality in New York City. By Schuyler Kohl. Price, $2.50. Pp. 112, with 67 charts. Harvard University Press, Cambridge 38, Mass., 1955.

Pädiatrischer Röntgenatlas. By Dr. M. A. Lassrich, Prof. Dr. R. Prevôt, and Prof. D. K. H. Schäfer. Price, $27.40. Pp. 333, with 700 illustrations. Georg Thieme Verlag, Stuttgart, Herdweg 63; American agent, Intercontinental Medical Book Corporation, New York 16, 1955.

A Handbook of Hospital Psychiatry. By Louis Linn. Price, $10. Pp. 560. International Universities Press, 227 W. 13th St., New York 11, 1955.

Sexual Hygiene and Pathology. By John F. Oliven. Price, $10. Pp. 481. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5, 1955.

Clinical Pathologic Conferences of Cook County Hospital: Vol. 1. Cardiovascular-Renal Problems. Edited by Hans Popper and Daniel S. Kushner. Price, $5. Pp. 325, with numerous illustrations. McGraw-Hill Book Company, Inc., 330 W. 42d St., New York 36, 1954.

Annual Review of Medicine. Vol. 6. Edited by David A. Rytand and John Anderson. Price, $7. Pp. 459 Annual Reviews, Inc., Stanford, Calif., 1955.

Diseases of Infancy and Childhood. Ed. 7. By Wilfrid Sheldon. Price, $10. Pp. 804, with 231 illustrations. Little, Brown & Company, 34 Beacon St., Boston 6, 1955.

Handbook of Pediatrics. By Henry K. Silver, C. Henry Kempe, and Henry B. Bruyn. Price, $3. Pp. 548. Lange Medical Publications, University Medical Publishers, Box 1215, Los Altos, Calif., 1955.

International Symposium: The Hypophyseal Growth Hormone, Nature and Actions. Edited by Richmond W. Smith Jr., Oliver H. Gaebler, and C. N. H. Long. Price, $12. Pp. 576, with numerous illustrations. McGraw-Hill Book Company, Inc., 330 W. 42d St., New York 36, 1955.

Airborne Contagion and Air Hygiene. By William Firth Wells. Price, $6. Pp. 423, with 85 illustrations. Harvard University Press, Cambridge 38, Mass., 1955.

Communicable Disease. Ed. 3. By Franklin H. Top. Price, $18.50. Pp. 1208, with 109 illustrations. C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1955.

Talking with Patients. By Brian Bird. Price, $3. Pp. 154. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5, 1955.

Ciba Foundation Colloquia on Ageing. Vol. 1. Edited by G. E. W. Wolstenholme and Margaret P. Cameron. Price, $6.75. Pp. 255. Little, Brown & Company, 34 Beacon St., Boston 6, 1955.

Directory of Pediatric Societies *

INTERNATIONAL

Eighth International Congress of Paediatrics

President: P. Plum Professor, M.D., Domus Medica, Kristianiagade, Copenhagen.

International Union for Child Welfare

President: Mrs. Gordon Morier.
Secretary: Dr. Georges Thélin, 16 rue du Mont Blanc, Geneva, Switzerland.

FOREIGN

Academy of Medicine, Toronto, Section of Paediatrics

Chairman: Dr. Bernard Laski, Toronto.
Secretary: Dr. Crawford Anglin, Toronto.
Place: Academy of Medicine.

Asociación de Pediatrias Españoles

President: Dr. Rafael Ramos Fernández.
Vice-Presidents: Dr. Juan Bosch Marín and Dr. Ciriaco Laguña.
Secretary-General: Dr. Luis Navas Migueloa.
Treasurer: Dr. Angel Ballabriga.

Australian Paediatric Association

President: Dr. P. A. Earnshaw, Ballow Chambers, Wickham Terrace, Brisbane. B17.
Honorary Secretary-Treasurer: Dr. D. C. Jackson, 217 Wickham Terrace, Brisbane. B17.
Place: Canberra. Time: Yearly in April.

British Paediatric Association

President: Prof. Stanley Graham.
Honorary Secretary: Dr. Reginald Lightwood, Paediatric Unit, St. Mary's Hospital Medical School, London, W. C. 2.
Honorary Secretary: Dr. Philip Evans, Hospital for Sick Children, Great Ormond St., London W. C. 1.
Place: Windermere. Time: Between Easter and Whitsunday.

Canadian Paediatric Society

President: Dr. G. R. Gayman, 710 Seymour St., Vancouver 2, B. C.
Secretary-Treasurer: Dr. J. C. Rathbun, 526 Waterloo St., London, Ont.

Clinical Pediatric Society of Israel

President: Dr. Stanley Levin, Government Hospital, Tiberias.
Vice-Presidents: Dr. Shimon Winter and Dr. George Mundel.
Place: Children's Departments of various hospitals. Time: Last Thursday of the month.

Danish Pediatric Society

President: Dr. A. Rothe-Meyer, Children's Hospital, Fûglebakken, Copenhagen F.
Secretary: Dr. E. Winge Flensborg, Children's Hospital, Martinsvej, Copenhagen V.
Place: Different hospitals. Time: First Wednesday of every month.

Departamento de Pediatria da Associação Paulista de Medicina

President: Dr. J. Leme da Fonseca.
Secretary: Dr. Joaquim da Costa Marques.

Departamento de Puericultura e Pediatria da Associação Medica do Parana

President: Dr. Haroldo Beltrao.
Secretary: Dr. Mucio de Ábreu Neto.

* Secretaries of societies are requested to furnish the information necessary to make this list complete and to keep it up to date.

DEUTSCHE GESELLSCHAFT FÜR KINDERHEILKUNDE

President: Prof. Dr. med. W. Keller, Freiburg/Brsg., Universitätskinderklinik.
Secretary: Prof. Dr. med. J. Jochims, Lübeck, Städtische Kinderklinik.
Place: Freiburg/Brsg. Time: September, 1955.

HELLENIC SOCIETY OF PEDIATRICS

President: Dr. A. Androutselli.
Honorary Secretary: Dr. A. Inglessi, 4 Milioni St., Athens.
Place: Lecture Theater, University of Athens. Time: Last Tuesday of each month, 7 p. m.

ISRAEL PEDIATRIC SOCIETY

Chairman: Prof. Sh. Rosenbaum, 26 Bialik St., Tel Aviv.
Secretary: Dr. R. Kochmann, 131 Ben Jehuda Rd., Tel Aviv.
Place: Tel Aviv.

NEDERLANDSE VEREENIGING VOOR KINDERGENEESKUNDE

President: Dr. G. J. Huët, 39 Brediusweg, Bussum.
Secretary: Dr. H. Reerink, % Sophia Kinderziekenhuis, 160 Gordelweg, Rotterdam.
Place: Children's Hospital or Pediatric Clinic. Time: Three times a year.

NORSK PEDIATRISK SELSKAP

President: Dr. Henrik Hagelstein, Children's Department, Rikshospitalet, Oslo.
Secretary: Dr. Kare Havard Torp, Children's Department, Ullevål Hospital, Oslo.
Time: Friday, six times a year.

PAEDIATRIC SOCIETY OF VICTORIA

President: Dr. Arthur J. Day.
Honorary Secretary: Dr. John H. Colebatch.
Place: Royal Children's Hospital, Melbourne. Time: Second Wednesday of each month, February to December, at 8 p.m.
A special Jubilee Meeting, lasting one week, is to be held in the spring of 1956.

PEDIATRIC SOCIETY OF NEW ZEALAND

President: Dr. Edward J. Cronin, Power Board Bldg., Queen St., Auckland.
Secretary: Dr. J. D. Matthews, 104 Symonds St., Auckland.

PHILIPPINE PEDIATRIC SOCIETY

President: Dr. Renato Ma. Guerrero.
Secretary: Dr. Felix A. Estrada.
Place: Santo Tomas University Hospital and other pediatric centers. Time: Every two months.

ROYAL SOCIETY OF MEDICINE, SECTION OF PAEDIATRICS

President: G. H. Macnab, F.R.C.S.
Honorary Secretaries: Ursula James, M.R.C.P., and Leslie Scott, M.D.
Sectional Editor: D. MacCarthy, M.D.
Place: 1 Wimpole St., London W.1 (Correspondence for these honorary officers should be sent to this address). Time: Fourth Friday of each month, 4:15 p.m.

SCHWEIZERISCHE GESELLSCHAFT FÜR PÄDIATRIE

President: Prof. W. Tobler, Brunnadernrain 11, Bern.
Vice-President: Prof. M. Jaccottet, Av. de Rumine, Lausanne.
Secretary: Dr. J. Haas, Westl. Alpenstrasse 3, Burgdorf.

SOCIEDAD ARGENTINA DE PEDIATRIE

President: Dr. Rudolfo Kreutzer.
Secretary: Dr. Luis M. Cucullu.
Place: Sante Fè 1178, Buenos Aires.

SOCIEDAD BOLIVIANA DE PEDIATRIA

President: Dr. Carlos Daza Meruvia.
Secretary: Dr. Cecilio Abela Deheza.
Place: S. C. I. S. P. Bldg. Time: Every Thursday.

Sociedad Chihuahuense de Pediatría

President: Dr. Alfonso Ruiz Escalona.
Secretary: Dr. Armando G. Herrera.
Place: Hospital Infantil del Estado, Chihuahua, Chih., Mexico.

Sociedad Chilena de Pediatria

President: Prof. Dr. Raúl Gantes A.
Secretary-General: Dr. Edmundo Cardemil.
Place: Medical Society, Merced 565, Santiago.

Sociedad Colombiana de Pediatria

President: Dr. Alfonso Vargas Rubiano.
Vice-President: Dr. Darío Gutiérrez Laserna.
Secretary: Dr. Omar García Bustamante.
Treasurer: Dr. Alfonso Gutiérrez Reyes.

Sociedad Cubana de Pediatria

President: Prof. Agustin Castellanos y Gonzales.
Secretary: Dr. Carlos Hernandez Miyares, Apartado 2430, Habana.
Place: Catedra de Clinica Infantil Hospital Nuestra Senora de las Mercedes and Hospital Municipal de Infancia, Habana. Time: 9 p.m., last Wednesday of every month.

Sociedad de Pediatría de Concepción (Chile)

President: Dr. Daniel Campos, Hospital Clínico Regional, Concepción.
Secretary: Dr. Obdulia Jiménez, Hospital Clínico Regional, Concepción.
Place: Hospital Clínico Regional Concepción. Time: 7:30 p.m., second Tuesday of every month, April to December, inclusive.

Sociedad de Pediatria del Litoral

President: Dr. Raul Bruera.
Vice-President: Dr. Isidoro Slullitel.
Secretary-General: Dr. Elsa Galimany.

Sociedad de Pediatria y Puericultura del Atlantico

President: Dr. Atilio Marino.
Vice-President: Dr. Helena Uribe de Jimenez.
Secretary-Treasurer: Dr. Hernando Barrios-Angulo.

Sociedade de Pediatria da Bahia

President: Dr. Elysio Pereira de Atbayde.
Secretary: Dr. Eliezer Audiface.

Sociedade de Pediatria de Pernambuco

President: Dr. Antonio Aureliano.
Secretary: Dr. Claudia Figueiredo.

Sociedade de Pediatria do Rio Grande do Sul

President: Dr. Francisco Talaia de Moura.
Secretary: Dr. Enio Pilla.

Sociedade de Puericultura e Pediatria do Maranbão

President: Dr. Odorico Amaral de Mattos.
Secretary: Dr. Joao Mohana.

Sociedade Mineira de Pediatria

President: Dr. Agostinho Fernandes.
Secretary: Dr. Celio Marques Scotti.

Sociedade Portugesa de Pediatria

President: Prof. Dr. Lucio de Almeida.
Vice-President: Dr. Cordeiro Ferreira.
Secretary-General: Prof. Dr. Carlos Salazar de Sousa.
Treasurer: Dr. Mario Cordeiro.
Place: Clinica pediatrica do Hospital D. Estefania, Lisbon. Time: Monthly.

Sociedad Uruguaya de Pediatria

President: Dr. Euclides Peluffo.
Secretary: Dr. Ruben Gorlero Bacigalupi.
Place: Av. Agraciada 1464, piso 13, Montevideo.

Sociedad Venezolana de Puericultura y Pediatría

President: Dr. H. Arroyo Parejo.
Vice-President: Dr. Manuel M. Lander.
Secretary: Dr. Guillermo Tovar E., P. O. Box 3122, Caracas.
Treasurer: Dr. Carlos Lares Compos.
Place: Hospital Municipal de Niños "J. M. de los Ríos," Caracas. Time: Once a month.

Sociedad Yucateca de Pediatria

President: Dr. Humberto Perez Concha.
Secretary: Dr. Prudencio Ruiz Salazar.
Treasurer: Dr. Jorge Antiveros Andrade.

La Société de Pédiatrie de Montréal

President: Dr. Henri Charbonneau, 3095 Cherbrooke, Montréal.
Secretary: Dr. Edmond Baril, 301 Carré St-Louis, Apt. 1, Montréal.
Time: Second Thursday of each month.

Société de Pédiatrie de Paris

President: Prof. Jean Cathala, 45 rue Scheffer, Paris XVI.
Secretary: Prof. Maurice Lamy, 94 rue de Varenne, Paris VII.
Place: Hôpital des Enfants Malades, 149 rue de Sèvres, Paris XV. Time: 4 p.m., third Tuesday of each month.

Société de Pédiatrie de Québec

President: Dr. Roland Thibaudeau, 203 des Erables, Québec.
Secretary: Dr. Euclide Dechêne, 312 du Roi, Québec.
Place: Quebec. Time: May and November.

Societá Italiana di Pediatria

President: Prof. Giuseppe Caronia.
Vice-Presidents: Prof. Mario Cotellessa and Prof. Gaetano Salvioli.
Secretary: Prof. Rolando Bulgarelli.

South African Paediatric Association

Chairman: Dr. H. L. Wallace, Durban.
Honorary Secretary-Treasurer: Dr. F. Walt, 126 Trust Bulidings, Gardiner St., Durban.

Swedish Association of Pediatrics

President: Prof. Sture Siwe, Lund.
Secretary: Dr. Karl-Axel Melin, Färjestadsvägen 16, Bromma.

Swedish Medical Society, Section for Pediatrics and School Hygiene

President: Docent Justus, Ström, Stockholm.
Secretary: Dr. M. d'Avignon, Pediatric Clinic, Karolinska Sjukhuset, Stockholm 60.
Place: Swedish Medical Society, Klara Östra Kyrkogata 10, Stockholm. Time: Second Friday of each month, except summer.

UNITED STATES

National

American Medical Association, Section on Pediatrics

Chairman: Dr. William Weston Jr., 1428 Lady St., Columbia 1. S. C.
Vice-Chairman: Dr. Thurman B. Givan, 115 Remsen St., Brooklyn 2.
Secretary: Dr. Wyman C. C. Cole, 3001 W. Grand Blvd., Detroit 2.

American Academy of Pediatrics

President: Dr. Crawford Bost, 115 Terrace Dr., San Francisco 27.
Vice-President: Dr. Harry Bakwin, 132 E. 71st St., New York 21.
Executive Secretary: Dr. E. H. Christopherson, 610 Church St., Evanston, Ill.
Treasurer: Dr. Edgar E. Martmer, 693 Washington Rd., Grosse Point 30, Mich.

Society for Pediatric Research

President: Dr. Russell Blattner.
Vice-President: Dr. Harold E. Harrison.
Secretary-Treasurer: Dr. Sydney S. Gellis, Boston.

The American Pediatric Society

President: Dr. Allan M. Butler.
Vice-President: Dr. Bruce Chown.
Secretary-Treasurer: Dr. Aims C. McGuinness, 1427 I St., N. W., Washington 5, D. C.

Sectional

Intermountain Pediatric Society

President: Dr. Warren Tepper, 508 E. S. Temple St., Salt Lake City.
Vice-President: Dr. Stanley Child, 2000 S. 9th E., Salt Lake City.
Secretary-Treasurer: Dr. Merritt H. Egan, 2000 S. 13th E., Salt Lake City.
Place: Ambassador Athletic Club, Salt Lake City. Time: 7 p.m.

New England Pediatric Society

President: Dr. Reuben C. Bates, 122 Waterman St., Providence, R. I.
Vice-President (President-Elect): Dr. Louis K. Diamond, 300 Longwood Ave., Boston.
Secretary-Treasurer: Dr. Harry Shwachman, 300 Longwood Ave., Boston.
Place: Boston, except Spring meeting. Time: Wednesdays, four times a year.

North Pacific Pediatric Society

President: Dr. Carl Ashley, 2455 N. W. Marshall St., Portland, Ore.
Secretary-Treasurer: Dr. S. Gorham Babson, 1107 S. W. 13th St., Portland, Ore.

Northwestern Pediatric Society

President: Dr. A. J. Ouellette, 1530 Larpenteur Ave., St. Paul.
Vice-President: Dr. Elizabeth Lowry, 301 Kenwood Parkway, Minneapolis.
Secretary-Treasurer: Dr. T. C. Papermaster, 215 Doctors' Bldg., Minneapolis.
Place: Minneapolis; St. Paul; Duluth, Minn., and Rochester, Minn. Time: January, April, July, and October.

Rocky Mountain Pediatric Society

President: Dr. Edwin Williams.
Vice-President: Dr. Oliver K. Scott.
Secretary-Treasurer: Dr. John H. Githens, Denver.

Southwestern Pediatric Society

President: Dr. Harold Weatherman, 2001 Fourth Ave., San Diego 1, Calif.
Secretary: Dr. Thomas L. Harris, 436 N. Roxbury Dr., Beverly Hills, Calif.
Place: Jonathan Club of Los Angeles. Time: 6:30 p.m., second Wednesday in January, March, May, September, and November.

Western Society for Pediatric Research

President: Dr. Robert Aldrich.
Secretary-Treasurer: Dr. Forrest Adams.

State

Alabama Pediatric Society

President: Dr. David B. Monsky, 748 Adams St., Montgomery 5.
Secretary: Dr. Alice H. Pye, 305 Church St., Montgomery.
Place: Montgomery.

Arizona Pediatric Society

President: Dr. Jacob M. Sobol, 802 N. 2d Ave., Phoenix.
Secretary-Treasurer: Dr. Fred E. Ewart, 24 N. Hibbert St., Mesa.
Time: On Call.

California Medical Association, Section on Pediatrics

Chairman: Dr. Joseph W. St. Geme, 511 S. Bonnie Brae, Los Angeles 5.
Secretary: Dr. Alvin H. Jacobs, 2201 Webster St., San Francisco 15.
Assistant Secretary: Dr. Clement J. Molony, 416 N. Bedford Dr., Beverly Hills.

Florida State Pediatric Society

President: Dr. Wesley S. Nock, 273 Alhambra Circle, Coral Gables.
Vice-President: Dr. Joel V. McCall Jr., 111 Broadway, Daytona Beach.
Secretary-Treasurer: Dr. Henry G. Morton, 1950 Arlington Ave., Sarasota.

Georgia Pediatric Society

President: Dr. John A. Simpson, Athens.
Secretary: Dr. J. Harry Lange, 490 Peachtree St., Atlanta.
Place: Savannah. Time: At time of annual state meeting.

Hezekiah Beardsley Pediatric Club of Connecticut

President: Dr. Louis Spekter, Division of Crippled Children, Department of Health, State of Connecticut, Hartford.
Secretary: Dr. Frank E. Roth, 179 Allyn St., Hartford.
Time: With the Connecticut State Medical Society in the spring, with the Connecticut State Clinical Congress in the fall; winter meeting usually in December.

Illinois State Medical Society, Section on Pediatrics

Chairman: Howard R. Miller, 418 Jefferson Bldg., Peoria 2.
Secretary: Harry H. Boyle, 2376 E. 71st St., Chicago 49.

Indiana State Pediatric Society

President: Dr. Harold D. Lynch, Evansville.
Secretary: Dr. L. T. Meiks, Indianapolis.

Iowa Pediatric Society

President: Dr. Arlan F. Harrington, 311 27th St., Dr. S. E., Cedar Rapids.
Vice-President: Dr. James E. Dyson, 3200 University Ave., Des Moines.
Secretary-Treasurer: Dr. Ralph E. Dyson, 3200 University Ave., Des Moines.
Place: Spring meeting in conjunction with the Iowa State Medical Society meeting. Fall meeting in Sept., at University Hospital, Pediatric Dept., Iowa City.

Kansas State Pediatric Society

President: Dr. Bertrand I. Krehbiel, 918 W. 10th St., Topeka.
Secretary: Dr. C. T. Hinshaw, 357 N. Hillside, Wichita.
Time and Place: May, Hutchinson; September, Emporia.

Kentucky Pediatric Society

President: Dr. Alex J. Steigman, University of Louisville School of Medicine, Louisville.
Vice-President: Dr. Daniel B. McIlvoy Jr., Bowling Green.
Secretary-Treasurer: Dr. Selby V. Love, 108 Cannons Lane, Louisville 6.
Place: Louisville. Time: Spring.

Louisiana State Pediatric Society

President: Dr. Jack E. Strange, 3439 Prytania, New Orleans.
Vice-President: Dr. Charles E. Anderson, 1560 Line, Shreveport.
Secretary: Dr. Joseph M. Perret Jr., 2329 S. Carrollton, New Orleans.
Treasurer: Dr. William C. Rivenbark, 1448 Louisiana Ave., New Orleans.
Place: New Orleans. Time: May.

Massachusetts Hospital Association

President: Dr. Philip D. Bonnet, Administrator, Massachusetts Memorial Hospitals, Boston.
Executive Secretary: Henry G. Brickman, 14 Somerset St., Boston 8.

Michigan State Medical Society, Pediatric Section

President: Dr. Horace L. French, 301 Seymour Ave., Lansing.
Secretary: Dr. Park S. Bradshaw, 1014 Jefferson St., Muskegon.

Montana Pediatric Society

President: Dr. Orville M. Moore, 555 Fuller Ave., Helena.
Secretary: Dr. Joseph W. Brinkley, 410 Central Ave., Great Falls.
Place: Variable. Time: Spring and fall.

Nebraska Pediatric Society

President: Dr. Paul Bandroft, Lincoln.
Vice-President: Dr. Charles Tompkins.
Secretary-Treasurer: Dr. A. J. Lombardo, 401 Aquila Ct., Omaha.
Place: Children's Memorial Hospital. Time: 6 p.m., dinner, third Thursday of each month.

New Hampshire Pediatric Society

President: Dr. MacLean J. Gill, 1 South St., Concord.
Secretary-Treasurer: Dr. Robert F. Wilson, 113 Locust St., Dover.
Place: Alternately Concord, Hanover, Laconia, and Manchester. Time: Four times a year.

New Mexico Pediatric Society

President: Dr. M. K. Wylder, Suite 14, Medical Arts Sq., Albuquerque.
Secretary: Dr. Ly Werner, Suite 25, Medical Arts Sq., Albuquerque.
Place: Variable. Time: Every two or three months.

North Carolina Pediatric Society

President: Dr. Wilburt C. Davison, Duke Hospital, Durham.
President-Elect: Dr. Charles F. Williams, 817 Hillsboro St., Raleigh.
Secretary: Dr. William H. Davis Jr., 720 W. 5th St., Winston-Salem.

South Carolina Pediatric Society

President: Dr. Walter Moore Hart, 117 W. Cheves St., Florence.
Secretary: Dr. John R. Paul Jr., 82 Rutledge Ave., Charleston.
Place: Columbia, S. C. Time: Second Monday and Tuesday in September.

Tennessee Pediatric Society

President: Dr. O. L. Von Canon, 846 McCallie Ave., Chattanooga.
Secretary: Dr. Oliver W. Hill, 4807 Newcom Ave., Knoxville.

Texas Pediatric Society

President: Dr. M. C. Carlisle, Waco.
President-Elect: Dr. Russell Blattner, Houston.
Secretary: Dr. James N. Walker, Fort Worth.
Treasurer: Dr. Jack M. Woodall, Big Springs.

Virginia Pediatric Society

President: Dr. T. J. Humphries, Roanoke.
Vice-President: Dr. F. R. Hopkins, Lynchburg.
Secretary-Treasurer: Dr. A. P. Booker, Charlottesville.

Wisconsin State Medical Society, Section of Pediatrics

Chairman: Dr. E. H. Pawsat, Fond du Lac.
Vice-Chairman: Dr. Samuel E. Kohn, Milwaukee.
Secretary: Dr. J. R. Schroder, Janesville.
Delegate: Dr. K. J. Winters, Wauwatosa.
Alternate Delegate: Dr. F. Mellencamp, Milwaukee.

Local

Academy of Medicine of Cleveland, Pediatric Section

Chairman: Dr. C. T. J. Dodge, 15457 Euclid Ave., Cleveland 12.
Secretary: Dr. Beulah Wells, 10515 Carnegie Ave., Cleveland 6.
Place: Allen Memorial Medical Library. Time: 8:15 p.m., October, December, February, and March.

Akron Pediatric Society

President: Dr. Joseph M. Ulrich.
Vice-President: Dr. Lewis E. Rector.
Secretary-Treasurer: Dr. Max E. Griffin.
Time: Quarterly.

Baltimore City Medical Society, Pediatric Section

President: Dr. Wilson Grubb, 4 E. 33d St., Baltimore 18.
Secretary: Dr. Gibson J. Wells, 3101 St. Paul St., Baltimore 18.
Place: 1211 Cathedral St., Baltimore 1. Time: 8:30 p.m., second Tuesday in November, January, and March.

Bronx Pediatric Society

President: Dr. M. H. Grand, 1749 Grand Concourse, New York.
Secretary: Dr. Charles T. Fried, 1220 Grand Concourse, New York.
Place: Morrisania City Hospital. Time: 8:30 p.m., second Wednesday of each month, except June, July, August, and September.

Brooklyn Academy of Pediatrics

President: Dr. Joseph Battaglia, 713 Bushwick Ave.
Secretary: Dr. A. H. Emerson, 7721 Ridge Blvd.
Place: Granada Hotel, Brooklyn. Time: 8:45 p.m., fourth Wednesday of February, March, April, October, and November.

Buffalo Pediatric Society

President: Dr. Norman Bender.
Secretary: Dr. George B. Rosenfeld, 442 Beach Rd.
Treasurer: Dr. Carl A. Stettenbenz.
Place: Children's Hospital, 219 Bryant St. Time: 8:30 p.m., first Monday of each month, September to June.

Central Illinois Pediatric Society

President: Dr. Carl E. Sibilsky, 815 First National Bank Bldg., Peoria.
President-Elect: Dr. O. E. Ehrhardt, 200 S. Grand E., Springfield.
Secretary-Treasurer: Dr. Richard E. Dukes, Carle Hospital Clinic, Urbana.
Place: As announced. Time: April and October each year.

Central New York Pediatric Club

President Dr. Frank Williams, 58 Swan St. S., Albany.
Secretary: Dr. Fred W. Bush, 325 Park Ave., Rochester.
Place: Various cities in New York State; fall meeting jointly with Upper New York State Academy of Pediatrics. Time: Third Tuesday of April and October.

Central Ohio Pediatric Society

President: Dr. O. W. Hosterman, 350 East Broad St., Columbus 15.
Secretary-Treasurer: Dr. John Riepenhoff, 2998 Sullivant Ave., Columbus.
Place: As announced. Tmie: Third Wednesday of September, November, January, March, and May.

Chicago Pediatric Society

President: Dr. Maxwell P. Borovsky, 30 N. Michigan Ave.
Vice-President: Dr. S. C. Henn, 2376 E. 71st St.
Secretary: Dr. Ralph H. Kunstadter, 664 N. Michigan Ave.
Place: Children's Memorial Hospital, 710 Fullerton Ave. Time: Third Tuesday of each month, October to May, inclusive.

Cincinnati Pediatric Society

President: Dr. John E. Allen, 3402 Clifton Ave.
Vice-President: Dr. Robert A. Lyon, Children's Hospital.
Secretary-Treasurer: Dr. William D. De Vaux, 7373 Brookcrest Ave.
Place: Children's Hospital, Elland Ave., Cincinnati. Time: On call.

Cleveland Academy of Medicine, Pediatric Section

Chairman: Dr. Robert Hauver, 10515 Carnegie Ave.
Secretary: Dr. William Herman, 10300 Carnegie Ave.

Corpus Christi Pediatric Society

President: Dr. M. Kurzner.
Vice-President: Dr. Jack McKemie.
Secretary-Treasurer: Dr. Hannah B. Woody.
Place: La Louisiane Restaurant. Time: 7.30 p.m., third Wednesday of January, March, May, July, September, and November.

Dade County Pediatric Society

President: Dr. Lynn Whelchel, DuPont Bldg., Miami, Fla.
Secretary: Dr. Howard Engle, 311 Lincoln Rd., Miami Beach, Fla.

Dallas Pediatric Society

President: Dr. Floyd A. Norman, 4325 Cole Ave., Dallas.
Secretary-Treasurer: Dr. Charles L. Smith, 4207 Lemmon Ave., Dallas.
Place: Children's Hospital of Texas. Time: 6:30 p.m., first Thursday in each month.

Detroit Pediatric Society

President: Dr. Benton M. Hamil, 2799 W. Grand Blvd.
Vice-President: Dr. Glen E. House, 18520 Grand River.
Secretary: Dr. Louis E. Heideman, 20211 Greenfield.
Treasurer: Dr. Charles G. Jennings, 14827 E. Jefferson.
Place: Variable. Time: Five times a year.
Permanent Mailing Address: 5224 St. Antoine (2).

Fort Worth Pediatric Society

President: Dr. M. W. Brous, 921 Eighth Ave.
Secretary-Treasurer: Dr. William D. Diamond, 554 S. Summit.
Place: Variable: Time: 6 30 p.m., third Friday of each month.

Honolulu Pediatric Society

President: Dr. John Peyton, Medical Group, 1133 Punchbowl St.
Recording Secretary: Goonzo Yamashita, 1618 S. King St.
Corresponding Secretary-Treasurer: Dr. H. M. Sexton, Straub Clinic, 1020 Kapiolani St.
Place: At doctors' homes in rotation. Time: 6 p.m., third Thursday of each month.

Houston Pediatric Society

President Dr. Fred M. Taylor, Baylor University College of Medicine.
Secretary: Dr. William Betts, 4205 Leeland.
Place: River Oaks Country Club. Time 6:30 p.m., fourth Tuesday of alternate months.

Kansas City Southwest Pediatric Society

President: Dr. Frank Houge, Plaza Medical Bldg., Kansas City, Mo.
Secretary: Dr. S. J. Kranson, Truman Rd. and Ash, Independence, Mo.
Place: University Club, Kansas City, Mo. Time: On call.

Long Beach Pediatric Society

President: Dr. Kenneth Berkaw, 211 Cherry Ave., Long Beach, Calif.
Secretary: Dr. C. W. Latshaw, 3821 Atlantic Ave., Long Beach, Calif.
Place: Victor Hugo Restaurant, 730 E. Broadway. Time: First Tuesday night of every month.

Los Angeles County Medical Association, Pediatric Section

President: Dr. Robert Shirley, 133 S. Lasky Dr., Beverly Hills, Calif.
Vice-President: Dr. Deron Housepian, 960 E. Green St., Pasadena, Calif.
Secretary: Dr. Margaret Jones, 405 Hilgard Ave., University of California School of Medicine at Los Angeles, Los Angeles 24.
Place: Los Angeles County Medical Association Bldg., 1025 Wilshire Blvd., Los Angeles. Time: Second Thursday of alternate months beginning in September.

Louisville Pediatric Society

President: Dr. Harry S. Andrews.
Vice-President: Dr. Joseph Little.
Secretary-Treasurer: Dr. Kenneth P. Crawford.
Place: Variable. Time: Five times a year, as announced.

Medical Society of the County of Kings and Academy of Medicine of Brooklyn, Pediatric Section

President: Bernard Greenberg, 755 Ocean Ave., Brooklyn 26.
Vice-President: Dr. Joseph Pincus, 881 Washington Ave., Brooklyn 25.
Secretary: Dr. Arthur L. Ruby, 1331 E. 19th St., Brooklyn 30.
Treasurer: Dr. David Dragutsky, 179 Marlboro Rd., Brooklyn.
Place: Kings County Medical Society Auditorium, 1313 Bedford Ave., Brooklyn. Time: 8:45 p.m., fourth Monday of January, March, April, October, and November.

Medical Society of the District of Columbia, Section on Pediatrics

President: Dr. George Maksim, 1418 Good Hope Rd. S. E., Washington 20.
Secretary: Dr. John E. Cassidy, 5402 Connecticut Ave. N.W., Washington.
Place: Medical Society Bldg., 1718 M St. N. W., Washington. Time: Spring and fall.

Memphis Pediatric Society

President: Dr. Clifton W. Woolley, 2448 Poplar Ave.
Vice-President: Dr. Steve H. Turnbull, 848 Adams.
Secretary-Treasurer: Dr. Charles H. Householder, 321 S. Bellevue.
Place: Rotated among four hospitals. Time: 7:30 p.m., second Tuesday of each month.

Milwaukee Pediatric Society

President: Dr. Kenneth Winters, Wauwatosa, Wis.
Secretary: Dr. James P. Conway, Milwaukee.
Place: Milwaukee University Club. Time: Second Wednesday of February, April, June, and October.

Mobile Pediatric Society

President: Dr. Daniel Sullivan, 1420 Government St., Mobile, Ala.
Secretary: Dr. Robert O. Harris III, 1514 Government St., Mobile, Ala.
Place: Admiral Semmes Hotel. Time: 7:30 p.m., fourth Thursday of September, November, January, March, and May.

Nashville Pediatric Society

President: Dr. Thomas Weaver, Bennie Dillon Bldg., Nashville, Tenn.
Secretary: Dr. Ethel Walker, 3415 West End Ave., Nashville, Tenn.
Place: Homes of members. Time: Third Thursday of every month.

Nassau Pediatric Society

President: Dr. John J. Eppig, 3096 Northern Blvd., Manhasset, N. Y.
Vice-President: Dr. Ralph M. Burns, Professional Center, Glen Head, N. Y.
Secretary-Treasurer: Dr. David J. Posner, 98 Walcott Rd., Levittown, N. Y.
Place: Felice's Restaurant, Post Ave., Westbury, N. Y. Time: 9:00 p.m., second Monday of October, December, February, April, and June.

New York Academy of Medicine, Section on Pediatrics

Chairman: Dr. Jerome L. Kohn, 50 W. 96th St., New York 25.
Secretary: Dr. Lawrence B. Slobody, 1 E. 105th St., New York 12.
Place: New York Academy of Medicine, 2 E. 103d St. Time: 8:30 p.m., second Thursday of each month, November to May, inclusive.

Northern California Pediatric Society

President: Dr. Joseph H. Davis, 300 Homer Ave., Palo Alto.
Secretary-Treasurer: Dr. Samuel Hurwitz, 6200 Geary Blvd., San Francisco 21.
Place: San Francisco. Time: Quarterly, as speakers are available.

Northern Ohio Pediatric Society

President: Dr. Earl E. Smith.
President-Elect: Dr. Chauncey Wyckoff.
Secretary-Treasurer: Dr. C. Q. McClelland.

Oklahoma City Pediatric Society

President: Dr. C. M. Bielstein, 301 N. W. 12th St., Oklahoma City.
Secretary: Dr. Louis Frank, 1200 N. Walker St., Oklahoma City.
Place: Oklahoma Club. Time: On call.

Philadelphia Pediatric Society

President: Dr. Elizabeth Kirk Rose, 426 Owen Rd., Wynnewood, Pa.
Secretary: Dr. Robert H. High, 316 Simms St., Philadelphia 16.
Place: College of Physicians, 19 S. 22d St. Time: 8:30 p.m., second Tuesday from October to May, inclusive.

Pittsburgh Pediatric Society

President: Dr. W. W. Briant, 633 Washington Rd.
Vice-President: Dr. Robert R. Macdonald, 448 Brownsville Rd.
Secretary-Treasurer: Dr. Bernard I. Michaels, 3500 Fifth Ave.
Place: Western State Psychiatric Institute and Clinic. Time: October, December, February, and April.

Queens Pediatric Society

President: Dr. Moe Goldstein, 111-32 76th Ave., Forest Hills, N. Y.
Secretary: Dr. John Finnegan, 36-19 Bowne St., Flushing, N. Y.
Place: Seminole Club, 112th St. and 70th Rd., Forest Hills, N. Y. Time: Second Tuesday in October, December, February, and April.

Richmond Pediatric Society

President: Dr. Hobart T. Dougan, 1832 Monument Ave., Richmond 20, Va.
Secretary: Dr. Robert A. Hoffman, 1001 W. Franklin St., Richmond 20, Va.
Place: Medical College Hospital. Time: 8 p.m., third Thursday of each month, except June, July, and August.

San Antonio Pediatric Society

President: Dr. Philip Magrish, 402 Fulton Ave.
Secretary: Dr. Jack M. Wright, 403 Summit Ave.
Time: 7:30 p.m., supper, first Tuesday of each month.

St. Louis Pediatric Society

President: Dr. H. E. Wachter, 8505 Delmar.
Vice-President: Dr. Raymond J. LaDriere, 35 No. Central, Clayton 5, Mo.
Secretary-Treasurer: Dr. Leo F. Gowen, 337 W. Lockwood, Webster Groves 19, Mo.
Place: Medart's Restaurant. Time: 7 p.m., second Thursday of each month from September to May, inclusive.

Santa Barbara Pediatric Society

President: Dr. Clarence B. Hills, 22B. W. Micheltorena St., Santa Barbara, Calif.
Secretary: Dr. Louise P. Brown, 3017 Foothill Rd., Santa Barbara, Calif.
Place: Varies. Time: Two to three times yearly, on call.

Seattle Pediatric Society

President: Dr. O. William Anderson.
President-Elect: Dr. Robert Tidwell.
Secretary-Treasurer: Dr. James L. Tucker.
Place: College Club. Time: 6:30 p.m., fourth Friday of each month from September to June.

University of Michigan Pediatric and Infectious Disease Society

President: Dr. Fred J. Chapin, 101 John St., Bay City.
Secretary-Treasurer: Dr. George H. Lowrey, University Hospital, Ann Arbor.
Place: University Hospital, Ann Arbor.

Waco Pediatric Society

President: Dr. F. W. Hoehn.
Secretary: Dr. M. C. Carlisle.
Place: 1918 Austin Ave., Waco, Texas. Time: Third Tuesday of each month.

Westchester County Medical Society, Pediatric Section

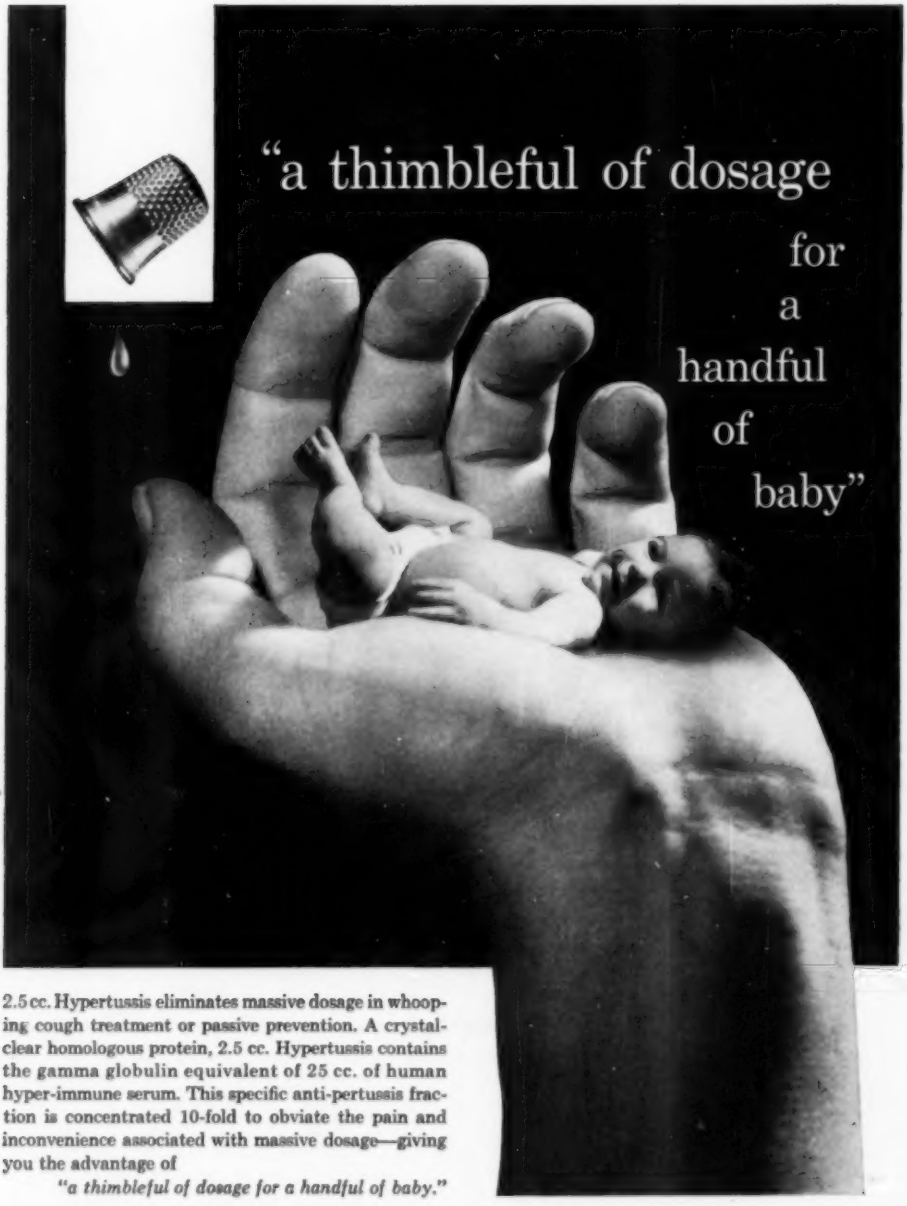
Chairman: Dr. Donald R. Reed, 14 S. Broadway, Irvington, N. Y.
Secretary: Dr. Elvira Ostlund, 64 Highland Rd., Rye, N. Y.
Place: The Roger Smith Hotel, White Plains, N. Y. Time: Four dinner meetings a year. November, February, April, and June.

Western Michigan Pediatric Society

President: Dr. A. Morgan Hill, 310 Fulton, E., Grand Rapids.
Secretary: Dr. John C. Montgomery, 1810 Wealthy St., S.E., Grand Rapids.
Place: Two meetings in Grand Rapids, two elsewhere. Time: First Wednesday of October. November, April, and May.

Wichita Pediatric Society

President: Dr. Mary Blood.
Secretary: Dr. R. A. Nelson.
Place: Homes of members. Time: 8:30 p.m., first Thursday, October through May.



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1. Deuel, H. J., Jr.: Newer Concepts of the Role of Fats and of the Essential Fatty Acids in the Diet, Food Res. *20*:81 (Jan.-Feb.) 1955.

2. Meng, H.C.: Preparation, Utilization, and Importance of Neutral Fat Emulsion in Intravenous Alimentation, in Najjar, V.A.: Fat Metabolism, Baltimore, The Johns Hopkins Press, 1954, pp. 69-92.

The nutritional statements made in this advertisement have been reviewed and found consistent with current medical opinion by the Council on Foods and Nutrition of the American Medical Association.

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*Schaefer, P. H.: Ohio State M. J. 61:347 (April) 1965.

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References: 1. Youngblood, V. H.: J. Urol. 70:926, 1955. 2. Carroll, G.: Pediat. Clin. N. America, 1955, pp. 781-791.

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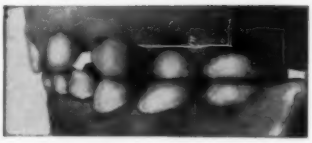

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*Shwachman, H., Children's Hospital, Boston; The Child in Health and Disease, Grulee and Eley, 2nd Edit.

Butler, A., Harvard Medical School, private communication.

Royce, S., Los Angeles Hospital, private communication.

Clay, W. A., Frank, D. W., and Logan, V. W., Studies on the Therapy of Pancreatic Insufficiency, Gastroenterology, 26: 169, 1954.

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Gibbs, G. E., Bradley, J. E., and Minor, J. V., Diagnosis and Treatment of Cystic Fibrosis of the Pancreas. J.A.M.A. 145: 1187 (1951).

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Approximate Analysis

Protein	4.9%
Carbohydrate	8.3
Fat	5.8
Ash	1.2
Calcium	0.19
Phosphorus	0.15
Iron	0.0016
Moisture	79.8
Calories per fl. oz.	32

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to help you combat iron deficiency in infants...

How Fer-In-Sol improved infants' blood pictures

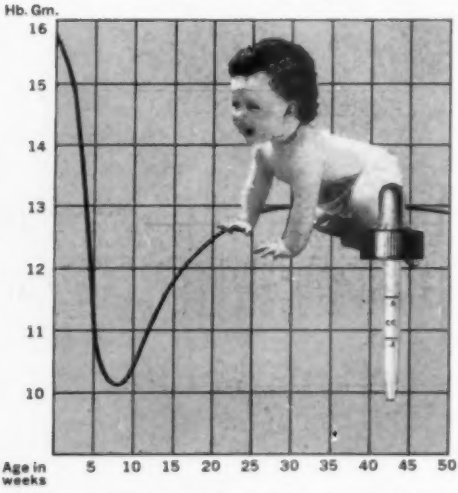

Chart adapted from Niccum, Jackson and Stearns: A.M.A. Am. J. Dis. Child. 86: 553, 1953.

Mean hemoglobin determinations of infants on a predominantly milk diet receiving Fer-In-Sol. The Fer-In-Sol dose was 5 mg. of iron (0.2 cc.) per day at 3 months, increased to 10 mg. of iron (0.4 cc.) after 6 months of age.[1]

Fer-In-Sol

iron in a drop for infants and children

"Iron deficiency anemia has a peak incidence between six months and two and one-half years..."[2]

Smith and Rosello[2] found that the peak incidence of iron deficiency in infants and children occurred between the ages of 6 and 24 months, when growth is most rapid. Sturgeon[4] reports that published data indicate iron deficiency in infants is common. Although consuming normal diets, the majority of infants in the last half of the first year of life, and throughout the second year of life, "exist in relatively severe states of iron deficiency (30% or more depleted)."[4]

Niccum, Jackson and Stearns[1] found that prophylactic administration of Fer-In-Sol in small daily doses "was sufficient to maintain hemoglobin values at a constant level throughout the latter half of infancy in all full term infants"... resulted in significantly higher hemoglobin values than did ferric ammonium citrate.

FER-IN-SOL

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Only 0.3 cc. of Fer-In-Sol supplies 7.5 mg. of iron—more than the Recommended Daily Allowance for children up to 4 years old. Fer-In-Sol is supplied in 15 cc. and economical 50 cc. bottles, with the new calibrated 'Safti-Dropper' of unbreakable plastic.

(1) Niccum, W. L.; Jackson, R. L., and Stearns, G.: A.M.A. Am. J. Dis. Child. 86: 553, 1953. (2) Smith, C. H.: Bull. New York Acad. Med. 30: 155, 1954. (3) Smith, N. J., and Rosello, S.: J. Clin. Nutrition 1: 375, 1953. (4) Sturgeon, P.: Pediatrics 13: 107, 1954.

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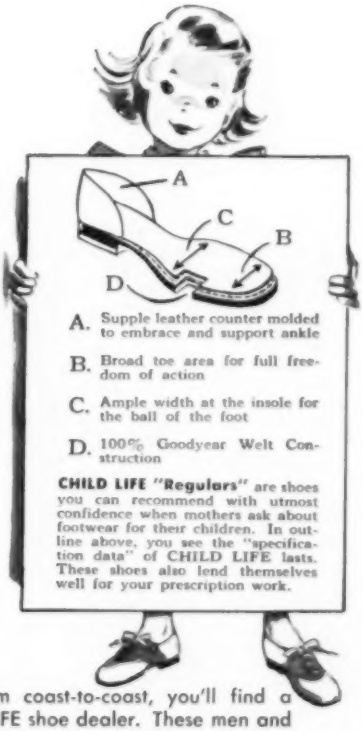

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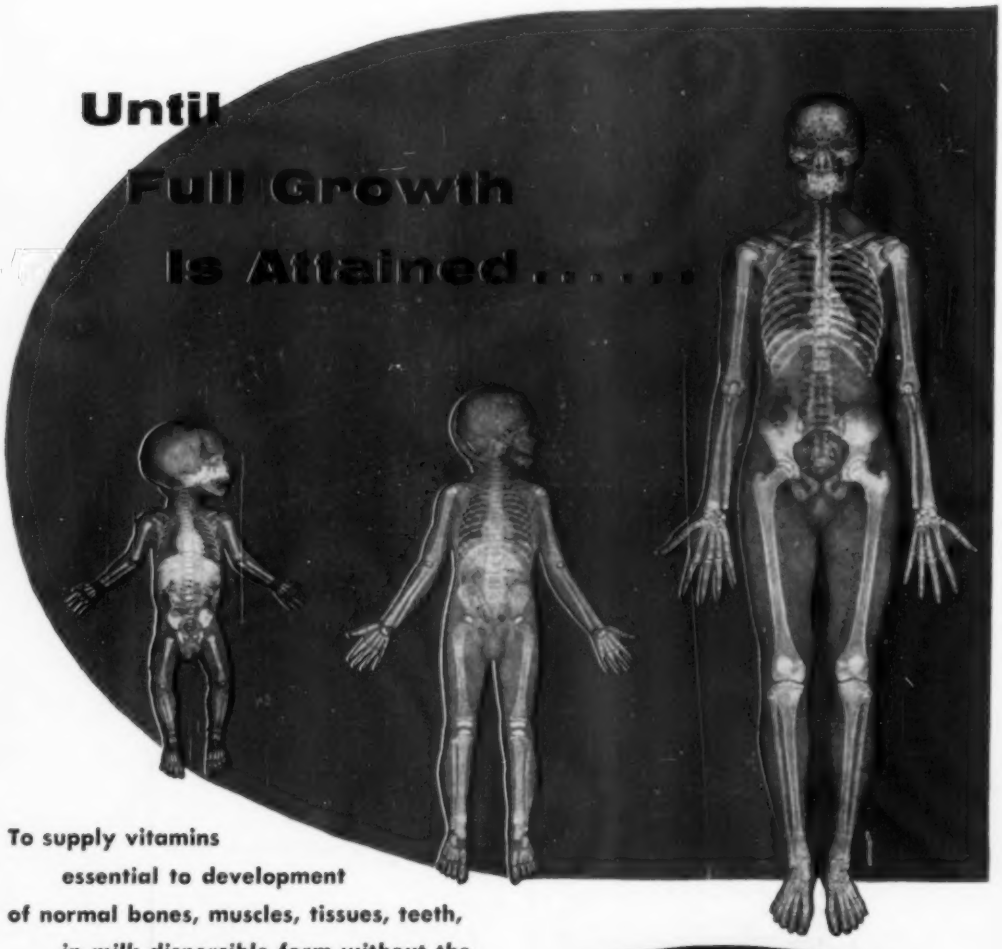

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